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PUBLICATIONS
OF THE
GEORGIA STATE
DEPARTMENT OF AGRICULTURE.

VOLUME VI.

FOR THE YEAR 1880.

J. T. HENDERSON, Commissioner.

ATLANTA, GA., FEBRUARY, 1880.

JAS. P. HARRISON & CO. PRINTERS, ATLANTA, GA.

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INTRODUCTION TO VOL. VI.

The current volume, and the five preceding, are not "REPORTS" in the usual sense of the term, but, as the title imports, are compilations of all the publications of the DEPARTMENT, of every character, issued during the year. These include the questions sent to correspondents, the replies to which constitute the basis of the Monthly Crop Reports, and, to a considerable extent, that of other publications.

"Rules and Regulations for the inspection of Fertilizers," and "Special Instructions to Inspectors," are given, in order that the details of the system may be more readily understood.

Volume VI. presents a sort of panoramic view of the work of the DEPARTMENT for the year 1880. It was not composed and printed in its entirety at the end of the year, but, in accordance with the system adopted at the inauguration of the Department, viz: At the time of printing, a specified number of each of the publications, blanks, etc., is filed in the office for binding in a volume at the end of the year.

For convenience of indexing the same, each publication is *double paged*, the usual marginal figures denoting the pages of the Circular, while the figures in the brackets [] denote the page of the Annual Volume. The GENERAL INDEX refers to these bracket pages.

Some of the publications are improperly paged, but the reader will find no difficulty in using the INDEX in consequence of this.

The method adopted, thus described, explains any apparent want of uniformity in style and mechanical execution, and in the quality of paper.

Contents of Volume VI.

CIRCULARS, MANUALS, ETC.

	PAGE.
Analyses of Commercial Fertilizers.....	3
Analyses and Statistics of Commercial Fertilizers 1879-80.....	73
Annual Report of Commissioner of Agriculture.....	345
April Crop Report.....	15
August Crop Report.....	109
July Crop Report.....	89
June Crop Report.....	49
Manual on Cattle.....	135
May Crop Report.....	31
Results of Soil Tests of Fertilizers.....	241
Rules and Regulations for Inspection of Fertilizers.....	127
September Crop Report.....	329
Supplemental Crop Report.....	393

SPECIAL CIRCULARS.

Questions for April Crop Report.....	11
Questions for May Crop Report.....	31
Questions for June Crop Report.....	45
Questions for July Crop Report.....	65
Questions for August Crop Report.....	105
Questions for September Crop Report.....	123
Questions for Supplemental Crop Report.....	387
Questions to Manufacturers.....	69
Special Instructions to Inspectors.....	131

Index to Volume VI.

A

Agricultural Organizations.....	384
Analyses and Statistics of Commercial Fertilizers.....	73-88
Analyses of Commercial Fertilizers.....	3
Annual Report of the Commissioner.....	345-386
Areas planted.....	13-30

B

Bacon—Cost of.....	398
--------------------	-----

C

Cattle—Manual on.....	135-326
Cattle Manual—Index to.....	321-326
Carp—German.....	381-408
Carp—Ponds for.....	410
Chemist.....	347
Chemists—Convention of.....	349
Corn—Cost of.....	398
Crop Report—Questions for April.....	11-14
Crop Report—For April.....	13-30
Crop Report—Questions for May.....	31-34
Crop Report—For May.....	31-44
Crop Report—Questions for June.....	45-48
Crop Report—For June.....	49-64
Crop Report—Questions for July.....	65-68
Crop Report—For July.....	89-104
Crop Report—Questions for August.....	105-108
Crop Report—For August.....	109-122
Crop Report—Questions for September.....	123-126
Crop Report—For September.....	329-344
Crop Report—Questions for Supplemental.....	387-390
Crop Report—Supplemental.....	393-412
Crop Yields.....	401

D

Directions for Conducting Soil Tests.....	1-2
---	-----

E

Experiment Station.....	370
-------------------------	-----

F

Farm—Experimental.....	370
Farmers—Condition of.....	397
Farmers—Indebtedness of.....	397
Farmers, Suggestions to.....	399
Fertilizers—Rules for Inspection of.....	127-130
Fertilizers—Results of Soil Tests of.....	327-398
Fertilizers—Results of Soil Tests of—Index to.....	393
Fertilizers—Analyses and Statistics of.....	73-88
Fertilizers—Chemist for Analysis of.....	347
Fertilizers—Inspectors of.....	348
Fisheries—Superintendent of.....	349
Fisheries—Report of Superintendent.....	377

G

German Carp.....	381-408
------------------	---------

I

Inspection of Fertilizers—Rules for.....	127-130
Inspectors of Fertilizers—Special Instructions to.....	131-134
Improved Seed.....	398
Improving Land.....	399

L

Land—Improving.....	399
---------------------	-----

M

Manufacturers—Questions to.....	69-72
Manual on Cattle.....	135-326
Manual on Cattle—Index to.....	321-326
Meteorological Report 1880.....	405-407

O

Organizations—Agricultural.....	384
Organizations—Horticultural.....	384

R

Rules and Regulations for Inspection of Fertilizers.....	127-130
Rice.....	394

S

Seed—Improved.....	398
Seed—Distribution of.....	398, 369
Shad.....	378
Soil Tests—Directions for Conducting.....	1-2
Soil Tests of Fertilizers—Results of.....	327-398
Soil Tests of Fertilizers—Index to.....	393
Supplies Purchased.....	397
Supplies—Cost of.....	398

W

Weather Reports 1880.....	405-407
---------------------------	---------

Special circular No. 4. }
NEW SERIES. }

DEPARTMENT OF AGRICULTURE, }
ATLANTA, GA., Feb'y 2d, 1880. }

DIRECTIONS FOR CONDUCTING THE SOIL TESTS OF FERTILIZERS
FOR THE YEAR 1880.

DEAR SIR:

You will please comply, as far as practicable, with the following "directions" in conducting the soil test of fertilizers sent you from this Department. Without the utmost care and accuracy in all observations, and in every detail of the work, from the preparation of the soil to the gathering of the crops, experiments are valueless.

Agricultural experiments are nothing more nor less than questions asked of Nature. If a question is not accurately and clearly asked, the interpretation of the answer will be difficult if not impossible.

Experimenters are therefore urged to give their personal supervision to every detail connected with the soil tests of commercial fertilizers received from the Department in order that they may possess, when the crop is gathered, all the data necessary to give a full and accurate report, not only of results, but of every essential circumstance connected with the experiment.

 *Reports are expected, whether the experiment results in success or failure.*

1. Select a plat of land as nearly uniform in character and fertility as possible.
2. If the test is to be made with corn, cotton, or any crop planted in rows, apply each fertilizer to four consecutive rows, 35 or 70 yards long, leaving four rows unfertilized between those fertilized with different brands, thus: A, four rows, without fertilizer, four rows; B, four rows without fertilizer, four; C, four, etc., through the plat. When the crop matures, gather the *two middle* rows of each four--fertilized and unfertilized, and weigh and record the same accurately. If it is cotton, weigh, and record carefully each separate picking and the date of each. If the test is made with small grain, or any crop sown broad-cast, lay off plats 35 or 70 yards long and 6 feet wide, with a vacant space one or two feet wide between the plats, and apply the fertilizer to each alternate plat; and when the crop is gathered, record separately the product of the fertilized and unfertilized plats. In all small-grain tests give the weight of the grain, and of the straw after the grain is thrashed out.
3. In these experiments, use each fertilizer or compost at the rate of 200 or 100 pounds per acre, regardless of cost, on cotton or corn; 200 pounds broad-cast on small grain.
4. In conducting these tests be careful to have the quality of the soil the preparation, planting, stand and cultivation, identical on each four rows, the only difference being in the kind or quality of fertilizer used. *Without this the test will not be reliable.*
5. *If compost is used, state the formula adopted in composting, giving the quantity and character of each ingredient, and the method employed in composting.*
6. If convenient, purchase on the market some of the same brands as those submitted for test, and report the result as directed in No. 2 above.

7. Use on the same plat any other brand which you may have.
 8. Use a portion of the samples submitted for test, in contrast with any others you may have, on any other crop on your farm or garden, and report result.
 9. When Acid Phosphate or Dissolved Bone—*not ammoniated*—is tested, compost it by formulæ for composting, given in the Circulars of this Department.
 10. Conduct any other test in any manner you may prefer, and report results and facts as above requested.
 11. Make a careful and accurate record of everything as it is done, or as it takes place. Let your record also contain the following, viz:
 - a. The character of the soil and sub-soil in which the test is made, whether sandy, clayey, marley or calcareous, and whether upland or bottom, how long in cultivation, and the character of the original growth.
 - b. Its previous treatment, both as to crops cultivated and fertilizers used for several previous years, and, if practicable, select a plat which was not fertilized in 1879.
 - c. The time and manner of preparation, time and manner of planting, modes of cultivation, seasons, both as to temperature and rainfall, and any other fact of interest connected with the test of fertilizers.
 12. When the crop is gathered, make a full report to the Department, embracing everything laid down in the foregoing, or that is connected with the experiment. Blanks on which to make out this report from the record made by you during the year, will be sent to you in November next.
- These experiments, to be valuable, should be conducted with great care, and the results accurately reported by the first day of December next, or as soon thereafter as the results can be ascertained.

Very Respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

*Circular No. 5, }
NEW SERIES. } Fourth Edition.]*

SEASON OF 1879-80.

ANALYSES

AND

COMMERCIAL VALUES

OF

COMMERCIAL FERTILIZERS

AND

CHEMICALS,

INSPECTED, ANALYZED AND ADMITTED TO SALE IN GEORGIA, TO
THE 20TH OF MARCH, 1880.

UNDER THE SUPERVISION OF
THE COMMISSIONER OF AGRICULTURE
OF THE STATE OF GEORGIA.

FOURTH EDITION.

ATLANTA, GEORGIA,
1880

EXPLANATIONS OF THE TABLES OF ANALYSES.

The table on the following pages shows the analyses of Commercial Fertilizers for the season of 1879-80, which have been inspected, analyzed, and admitted to sale in Georgia, up to the 20th March.

In arranging the Table, the chemical determinations to which no value is attached are first given, viz: Moisture, and Insoluble Phosphoric Acid.

Next are given the valuable determinations, viz: Soluble and Precipitated Phosphoric Acid, Ammonia, and Potash.

(The Soluble and Precipitated Phosphoric Acid are entered in separate columns, but being of equal value, the same money value is given to them, hence, the sum of these two is placed in one column, making the Total Available Phosphoric Acid).

NOTE—Insoluble Phosphoric Acid is not available, as a plant-food—especially, if derived from phosphate rock; but, if derived from animal bone is valuable if immediate results are not desired.

The determinations in the analysis are given in *percentages*.

After the chemical determinations, are the “commercial values,” or approximate estimate of the *real worth* of the valuable ingredients found by analysis *in a ton* of each fertilizer.

NOTE.—These “commercial values” are a means of comparing the real values of fertilizers, one with another. It is more convenient to compare the aggregate value of all valuable ingredients in *dollars and cents* than otherwise. They represent approximately *the true value* of the several fertilizers at Savannah.

Commercial values are followed by the names and places of dealers and manufacturers. These are given *as reported to the Department by the Inspectors*.

The following prices *per pound* of the valuable ingredients or elements of plant-food found in the fertilizers by analysis, have been adopted as a practical approximation to their true value at Savannah, viz :

Available Phosphoric Acid.....	12½ cents per pound.
Ammonia	18 cents per pound.
Potash.....	8 cents per pound.

The commercial values are calculated as follows: The “Available Phosphoric Acid,” “Ammonia,” and “Potash,” being the valuable ingredients for which the farmer pays his money—they, only, are considered in ascertaining the commercial value. The numbers in the respective columns of these ingredients indicate the *number of pounds* of each in one hundred pounds of the fertilizer.

To ascertain the value of the Available Phosphoric Acid in a fertilizer, multiply the number in that column by 12½ (the value in cents of one pound) for the value of that element in 100 pounds; which product, multiplied by 20 (twenty times 100 pounds makes 2,000 pounds, or one ton,) will give the value of the Available Phosphoric Acid in one ton.

Multiply the number of pounds of Ammonia by 18 (the value in cents of one pound.) This product, multiplied by 20, will give the value of the Ammonia in a ton.

Multiply the Potash by 8 (the value in cents of a pound, and the product by 20, which will give the value of Potash in a ton.

Then add these values together, and you will have the commercial value of a ton of the fertilizer.

J. T. HENDERSON,
Commissioner of Agriculture.

Etivan Potash Compound.....	10.46	3.38	10.44	14.32	1.89	33	82	C. A. Chisolm, Charleston, S. C.	Etivan Phos. Co., Charleston, S. C.			
Empire Guano.....	15.50	4.88	5.75	8.62	1.06	31	47	H. T. Inman, Atlanta, Ga.	R. W. L. Rainsin & Co., Baltimore, Md.			
Eureka Am'd Bone Sup. Phos. Lime.....	12.15	4.71	6.70	9.36	2.46	32	26	J. M. Johnson, Macon, Ga.	Atlantic & Va. Fertz. Co., Orient, L.I.			
Eutaw Acid Phosphate.....	12.65	6.70	7.15	10.41	0.69	25	99	Roberts, Taylor & Co., Ch's'n, S.C.	Atlantic Phos. Co., Charleston, S. C.			
Georgia Dissolv'd Bone.....	12.65	0.95	10.35	12.15	0.76	31	59	Chas. C. Hardwick, Savannah, Ga.	Preston Fertilizer Co., New York.			
Georgia Guano Dissolved Bone.....	13.47	1.74	13.65	2.18	15.73	.....	31	35	Baldwin & Co., Savannah, Ga.	Baldwin & Co., Passaic River, N. J.	
Georgia State Guano Acid Phos.....	16.39	2.74	9.07	3.47	12.54	.....	31	35	Baldwin & Co., Savannah, Ga.	Baldwin & Co., Passaic River, N. J.	
Georgia State Guano Fertilizer.....	16.39	2.74	9.14	0.90	10.64	3.36	.....	37	29	Baldwin & Co., Savannah, Ga.	Baldwin & Co., Newark, N. J.
Georgia Chem. Works Acid Phos.....	11.63	3.00	9.71	3.98	13.75	.....	35	53	M. A. Stovall, Augusta, Ga.	Ga. Chemical Works, Augusta, Ga.	
Gossypium Phospho.....	5.73	2.58	4.53	6.02	10.55	2.81	1.76	39	31	Geo. W. Scott & Co., Atlanta, Ga.	Geo. W. Scott & Co., Atlanta, Ga.	
Giant Guano.....	13.35	3.70	2.75	5.49	8.15	2.58	0.69	29	54	Wright & Crane, Augusta, Ga.	R. W. L. Rainsin & Co., Balt., Md.	
Guano Mixture.....	14.35	4.84	3.93	4.56	8.49	2.56	1.62	33	03	D. E. Hull, Savannah, Ga.	Patapasco Guano Co., Baltimore, Md.	
Guano Mixture.....	16.66	2.16	3.94	5.61	9.55	2.64	2.32	37	09	M. A. Stovall, Augusta, Ga.	Ga. Chemical Works, Augusta, Ga.	
Guano Mixture.....	14.35	3.70	2.75	5.49	8.15	2.58	0.69	29	54	R. W. L. Rainsin & Co., Balt., Md.	R. W. L. Rainsin & Co., Balt., Md.	
Hope Guano.....	14.35	3.70	2.75	5.49	8.15	2.58	0.69	29	54	R. W. L. Rainsin & Co., Balt., Md.	R. W. L. Rainsin & Co., Balt., Md.	
King Guano.....	12.95	4.84	8.93	4.56	8.49	2.56	1.62	33	03	D. E. Hull, Savannah, Ga.	Patapasco Guano Co., Baltimore, Md.	
Liebig's Am'd Dis. Bone.....	13.72	5.40	5.00	3.86	9.36	2.01	1.21	32	57	Lorenz & Ritter, Atlanta, Ga.	Lorenz & Ritter, Baltimore, Md.	
L. & K. Am'd Sol. Phosphate.....	17.17	2.10	8.35	2.50	10.85	2.28	1.47	35	15	Baldwin & Co., Savannah, Ga.	Lister Bros., Newark, N. J.	
Lister Bros. Standard Pure Bone.....	12.73	3.16	6.12	3.57	9.69	2.38	1.96	35	15	Baldwin & Co., Savannah, Ga.	Lister Bros., Newark, N. J.	
Lister Bros. Crescent Bone Fertilizer.....	14.15	2.25	6.30	3.26	9.56	2.20	0.53	31	45	Horn & McGhee, Rome, Ga.	Jno. R. Long & Co., Baltimore, Md.	
do (Subsequent inspection.).....	15.89	3.32	0.88	1.36	12.24	.....	0.53	31	45	Horn & McGhee, Rome, Ga.	Jno. R. Long & Co., Baltimore, Md.
Long's Prepared Chemicals.....	14.35	3.70	2.75	5.40	8.15	2.28	0.69	29	54	Hugh T. Inman & Co., Atlanta.....	R. W. L. Rainsin & Co., Baltimore, Md.	
Lilly's Early Opener.....	16.20	5.29	3.05	6.36	9.41	2.22	2.32	37	09	M. A. Stovall, Augusta, Ga.	Mapes' Formula Peruvian Co., N. Y.	
Mapes' Nitrogenized Sup. Phos.....	16.66	2.15	8.94	5.61	9.55	2.64	1.77	31	58	R. J. Baker & Co., Baltimore.....	Ga. Chemical Works, Augusta, Ga.	
Mastodon Am'd Superphosphate.....	12.62	5.25	5.73	2.64	8.39	2.16	0.29	40	27	Jno. Merryman & Co., Baltimore, Md.	Jno. Merryman & Co., Baltimore, Md.	
Mathis' Chemical Fertilizer.....	11.23	3.46	12.72	0.63	13.37	0.58	.....	37	96	A. A. Fletcher, Marietta, Ga.	Jno. Merryman & Co., Baltimore, Md.
Merriman's Acid Phosphate.....	14.35	1.46	9.96	1.93	11.89	2.81	0.29	40	27	Jno. Merryman & Co., Baltimore, Md.	Jno. Merryman & Co., Baltimore, Md.	
Merriman's Ammoniated Dis. Bone.....	12.82	0.58	5.40	6.73	12.13	2.12	.....	37	96	A. A. Fletcher, Marietta, Ga.	Northwestern Fertz. Co., St. Louis.
Monard City Guano.....	16.50	2.07	2.15	5.98	8.13	2.88	1.17	35	69	A. A. Fletcher, Marietta, Ga.	No. Western Fertz. Co., St. Louis, Mo	
National Bone Dust.....	11.40	3.27	8.00	1.12	9.12	3.06	2.11	33	37	J. M. Johnston, Macon, Ga.	G. Ober & Sons, Baltimore, Md.	
Ober & Sons' Sol. Sup. Phos. of Lime.....	15.65	2.86	6.50	1.74	8.21	2.46	.....	32	39	Barrett & Carswell, Augusta, Ga.	Atlantic & Vir. Fertz. Co., Orient, L. I
Orient Complete Manure.....	7.73	2.24	6.49	2.58	8.98	2.76	.....	32	39	Barrett & Carswell, Augusta, Ga.	Read & Co., New York.
"Old B".....	16.66	2.15	3.94	5.61	9.55	2.64	2.32	37	09	M. A. Stovall, Augusta, Ga.	Georgia Chemical Works, Augusta.	
Patapasco Guano.....	16.66	2.15	3.94	5.61	9.55	2.64	2.32	37	09	M. A. Stovall, Augusta, Ga.	Georgia Chemical Works, Augusta.	
Patapasco Co. Am'd Sol. Phos.....	16.66	2.15	3.94	5.61	9.55	2.64	2.32	37	09	M. A. Stovall, Augusta, Ga.	Ga. Chemical Works, Augusta, Ga.	
Pioneer Acid Phosphate.....	12.95	4.84	3.93	4.76	11.09	.....	1.62	33	03	D. E. Hull, Savannah, Ga.	Patapasco Guano Co., Baltimore, Md.
Pioneer Acid Phosphate.....	11.0	1.75	10.32	0.77	11.09	.....	2.25	31	33	H. Atkins & Co., Gainesville, Ga.	Stono Phos. Co., Charleston, S. C.
Plow Brand Raw Bone Sup. Phos.....	10.62	4.37	6.90	2.27	9.17	2.95	2.40	37	39	Walton, Whann & Co., Savannah.	Walton, Whann & Co., Wilmington, Del	
Pot-mac Guano.....	14.35	3.70	2.75	5.40	8.15	2.28	0.69	29	54	R. W. L. Rainsin & Co., Baltimore.	R. W. L. Rainsin & Co., Balt., Md.	
Pot-mac Guano.....	14.00	2.97	6.40	3.68	10.08	.....	1.06	26	90	Coleman & Newsome, Macon, Ga.	Perry M. DeLeon, New York.
Pure Dis. Bone (Chem. Co. of Canton).....	4.55	5.25	5.65	5.16	10.81	2.10	.....	34	59	McFarland & Barnard, LaGrange, Ga.	Chemical Co. of Canton.
Royal Superphosphate.....	10.33	1.17	8.49	2.05	10.45	3.06	.....	37	14	H. M. Comer & Co., Savannah	Bradley Fertilizer Co., Boston.
Ragsdale, John C., Am'd Dis. Bone.....	12.30	5.46	5.69	2.31	8.10	2.64	0.74	29	53	Winfield Peters, Baltimore, Md.	Winfield Peters, Baltimore, Md.	
Russell Coe's Am'd Bone Sup. Phos.....	18.30	0.97	10.53	0.60	11.13	2.50	0.88	29	54	R. W. L. Rainsin & Co., Baltimore	Russell Coe, Linden, N. J.	
Roanoke Guano.....	14.35	3.70	2.75	5.40	8.15	2.28	0.69	29	54	R. W. L. Rainsin & Co., Baltimore	R. W. L. Rainsin, Balt., Md.	
Sea Fowl Guano.....	9.64	4.80	7.75	1.82	9.57	2.82	.....	34	08	Langston & Crane, Atlanta, Ga.	Bradley Fertz. Co., Boston, Mass.
Slinguff's Pure Dissolved Bone.....	12.62	2.10	11.20	4.60	15.80	.....	1.62	33	03	D. E. Hull, Savannah, Ga.	Boykin, Carmer Co., New York.
Snowden's Cotton Compound.....	12.95	4.84	3.93	4.56	8.49	2.56	1.62	33	03	D. E. Hull, Savannah, Ga.	Patapasco Guano Co., Baltimore, Md.
Soluble Bone Phosphate.....	7.23	.....	9.90	2.81	12.71	.....	2.07	35	09	T. B. Thompson, Conyers, Ga.	Wando Phos. Co., Charleston, S. C.

TABLE—Continued.

NAMES OF FERTILIZERS.	ANALYSES.							By whom and where sold, or for whom Inspected and Analyzed.	By whom and where manufactured.	
	Moisture.	Phosphoric Acid.				Total Available.	Ammonia.			Potash.
		Insoluble.	Soluble.	Reverted.	Reverted.					
Soluble Pacific Guano.	12.56	2.00	6.63	3.15	9.78	3.03	1.07	37.07	Adair & Bro., Atlanta, Ga.	Pacific Guano Co., Charleston, S. C.
Sudwen's Sea Gull Am'd Dis. Bone	12.95	4.84	3.93	4.56	8.49	2.56	1.62	33.03	D. B. Hull, Savannah, Ga.	G. A. Liebig, Baltimore, Md.
Soluble Sea Island Guano.	14.35	3.70	2.75	5.49	8.15	2.28	0.60	29.54	R. W. L. Raisin & Co., Baltimore...	R. W. L. Raisin & Co., Balt., Md.
Standard Superphosphate.	19.77	2.87	6.25	1.75	8.00	2.40	0.97	30.19	Standard Fert. Co., Boston, Mass...	Stern's Fertilizer Co., Boston.
Stern's Am'd Bone Sup. Phos.	13.77	2.40	6.95	4.84	11.79	2.22	1.11	39.24	H. T. Inman & Co., Atlanta, Ga.	Stern's Fertilizer Co., N. O., La
South American Guano.	14.35	8.70	2.75	5.40	8.15	2.28	0.60	29.54	R. W. L. Raisin & Co., Baltimore...	R. W. L. Raisin & Co., Balt., Md.
Wando Acid Phosphate.	13.21	0.89	8.80	4.17	12.97	.....	2.27	36.05	Geo. E. Gibbon, Charleston, S. C.	Wando Phos. Co., Charleston, S. C.
Wando Fertilizer.	9.43	4.54	6.53	1.48	8.01	2.31	2.70	32.66	T. B. Thompson, Conyers, Ga.	Atlantic Phos. Co., Charleston, S. C.
Walton, Whann & Co.'s Man'd Guano	11.25	3.75	6.95	3.05	10.00	.....	0.84	26.34	Walton, Whann & Co., Savannah...	Wilcox, Gibbs & Co., Savannah, Ga.
Wilcox, Gibbs & Co.'s Man'd Guano	10.65	1.11	8.15	1.40	9.55	3.04	2.05	30.84	West Bros., Savannah, Ga.	New Jersey Chemical Co., Phila.
Watson & Clark's Sup. Phos. of Lime	13.74	3.29	5.52	3.82	9.34	2.08	0.93	27.80	P. Zell & Sons, Baltimore.	P. Zell & Sons, Baltimore, Md.
Zell's Cotton Acid Phosphate.	12.90	4.85	7.00	3.55	10.56	.....	2.76	32.43	P. Zell & Sons, Baltimore.	P. Zell & Sons, Baltimore, Md.
Zell's Am'd Bone Phosphate.	14.66	3.85	6.55	1.63	8.18	2.10	.....	.....	.....	.....
<i>Chemicals and Compounds other than Ammoniated Superphosphates and Acid Phosphates or Dissolved Bones.</i>										
Poppleins Silicated Phosphate.	12.45	2.73	1.00	7.74	8.74	0.95	2.99	30.05	Geo. J. Popplein.	Popplein Silicate Co. Baltimore, Md.
Johnson's Chemicals.	16.97	3.04	6.25	2.47	8.72	.....	1.74	24.58	Baldwin & Co., Savannah, Ga.	Baldwin & Co., Newark, N. J.
* These being among the first analyses made by the Chemist of the Department after his appointment, and their correctness being challenged, at the suggestion of Dr. Pratt himself, the Commissioner agreed to submit them for verification to Profs. H. C. White and C. V. Shepard, Jr. Higher results being obtained by these two chemists than by Dr. Pratt, it was deemed just that a majority should prevail. Later tests and investigations have satisfied the Commissioner that the determinations by Dr. Pratt's method are more reliable and just to all parties. They have been sustained in repeated tests by some of the most eminent chemists, among whom are Profs. S. W. Johnson of New Haven, Conn., and F. A. Genth of University of Pennsylvania. In justice to other manufacturers, the original analyses of these brands, as made by Dr. Pratt are given below, together with the calculated commercial values of the same.										
Baldwin & Co.'s Am. Dis. Bone.	10.20	2.54	3.20	0.85	9.07	1.49	1.07	31.41	Baldwin & Co., Savannah, Ga.	Baldwin & Co., Newark, N. J.
Lister Bros.' Crescent Bone Fertilizer	12.73	5.30	5.89	1.31	7.20	2.03	5.60	30.44	Baldwin & Co., Savannah, Ga.	Lister Bros., Newark, N. J.
Merryman's Am. Dis. Bone.	13.71	2.51	10.14	1.08	11.22	2.43	36.03	Jno. Merryman & Co., Baltimore, Md	Jno. Merryman & Co., Baltimore, Md	Pacific Guano Co., Charleston, S. C.
Soluble Pacific Guano.	12.56	2.03	6.34	2.58	8.96	2.89	.....	32.80	Adair & Bro., Atlanta, Ga.	Pacific Guano Co., Charleston, S. C.

* These being among the first analyses made by the Chemist of the Department after his appointment, and their correctness being challenged, at the suggestion of Dr. Pratt himself, the Commissioner agreed to submit them for verification to Profs. H. C. White and C. U. Shepard, Jr. Higher results being obtained by these two chemists than by Dr. Pratt, it was deemed just that a majority should prevail. Later tests and investigations have satisfied the Commissioner that the determinations by Dr. Pratt's method are more reliable and just to all parties. They have been sustained in repeated tests by some of the most eminent chemists, among whom are Profs. S. W. Johnson of New Haven, Conn., and F. A. Genth, of University of Pennsylvania. In justice to other manufacturers, the original analyses of these brands, as made by Dr. Pratt are given below, together with the calculated commercial values of the same.

Baldwin & Co.'s Am. Dis. Bone.	10.20	2.84	3.20	0.85	9.07	1.99	1.07	\$31.56	Baldwin & Co., Savannah, Ga.	Baldwin & Co., Newark, N. J.
Lister Bros.' Crescent Bone Fertilizer	12.73	5.30	5.89	1.31	7.20	2.03	5.30	35.41	Baldwin & Co., Savannah, Ga.	Lister Bros., Newark, N. J.
Merryman's Am. Dis. Bone.	13.71	2.51	10.14	1.08	11.22	2.48	.....	36.93	Jno. Merryman & Co., Baltimore, Md.	Jno. Merryman & Co., Baltimore, Md.
Soluble Pacific Guano.	12.56	2.03	6.33	2.58	8.96	2.89	.....	32.80	Adair & Bro., Atlanta, Ga.	Pacific Guano Co., Charleston, S. C.

* Soluble Silica, 16.31.

NOTE.—Farmers and dealers are hereby informed that many samples are still in the office of the Commissioner awaiting analysis, and are delayed for two reasons.—1st. Because of the multiplication of brands. 2d. Because of the inability of one chemist to dispatch the work in proper time.

Special Circular No. 5. }
NEW SERIES. }

REPORT OF AREAS PLANTED, GROWING CROPS,
ETC., FOR THE MONTH OF APRIL.

RETURNABLE MAY 1st, 1880.

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA., April 15, 1880.

DEAR SIR—Please answer the following questions **on the 1st day of May**, or a few days before, if necessary, and mail promptly, so that your report may reach this office **by the Third of May**.

Answer every question, that will permit of it, in numbers indicating per cent.

An AVERAGE CROP, or AVERAGE CONDITION, or anything with which comparison is made, is always taken as 100. Thus, if the corn crop at any time is 10 per cent. better than last year, or 10 per cent better than an average, it should be reported as 110 in each case; and if ten per cent. below these standards, it should be 90. Never report "10 per cent. better" or "10 per cent. worse," but 110 or 90, as the case may be. So avoid vague comparisons, such as, "some better," "hardly so good," "above an average," etc.

In making up your answers, let them apply to the whole county in which you reside, or as far in every direction as your knowledge may extend, *not simply to your own farm.*

If a crop about which questions are asked is not grown in your county, use the character **X**. If you have not sufficient data to make an approximate estimate, leave the space blank.

Very Respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

I. For what county do you report?.....county.

II. Your name?

III. Your post-office?.....

CORN.

1. Acreage compared to last year?.....per cent.
2. Preparation of soil compared to last year?.....per cent.
3. Stand compared to a good stand?.....per cent.
4. To what extent injured by frost?.....per cent.
5. To what extent injured by insects?.....per cent.

OATS.

6. Acreage compared to last year?.....per cent.
7. What per cent. of the crop sown last fall?.....per cent.
8. What per cent. of fall sown winter killed?per cent.
9. To what extent injured by rust?.....per cent.
10. Give facts as to varieties of oats, conditions as to soil, preparation and time of sowing,
 which seem to have contributed to producing rust?.....

11. Condition and prospects of fall sown, compared to an average?.....per cent.
12. Condition and prospects of spring sown, compared to an average?.....per cent.
13. Condition and prospects of the whole crop, compared to an average?.....per cent.

WHEAT.

14. Acreage compared to last year?.....per cent.
15. To what extent injured by rust?.....per cent.
16. To what extent injured by fly or other insects?.....per cent.

RICE.

30. Area in low-land rice compared to last year?.....per cent.
31. Area in upland rice, compared to last year?.....per cent.

MISCELLANEOUS.

32. Area in clover and cultivated grasses, compared to last year?.....per cent.
33. Condition and prospects compared to an average?.....per cent.
34. Which of the cultivated grasses has given best results?....per cent.
35. What class of soils has proven best adapted to clover and grasses?.....
.....
36. Has fall or spring sowing given better results?.....
37. Does sowing with small grain or alone, give better results?.....

FRUIT.

38. What is the fruit's prospect, including apples, peaches, pears and grapes, compared to
an average?.....per cent.
39. What per cent. has been added to the area in orchards and vineyards, during the past
fall, winter and spring?.....per cent.

STOCK.

40. Condition of sheep, compared to an average?.....per cent.
41. Drop of lambs, compared to an average?.....per cent.
42. Condition of work stock, compared to average?.....per cent.
43. Stock of hogs, all ages, compared to last year?.....per cent.
44. What diseases, if any, have affected stock this spring?.....

SEASONS.

45. Has the spring been favorable or unfavorable for farming operations in your county?
.....
46. What was the date of the last killing frost?.....

Circular No. 6. }
NEW SERIES. }

Consolidation of the Reports of Crops, Etc., FOR THE MONTH OF APRIL, 1880.

RETURNED TO THE DEPARTMENT OF AGRICULTURE MAY 1, 1880.

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA., May 12, 1880.

CORN.

The area in corn in the whole State, compared to that of last year, is 98, or two per cent. less. The stand, however, is reported 2 per cent. higher than last year. The acreage in the different sections are: North Georgia, 97, Middle Georgia, 95, South West Georgia, 101, East Georgia, 97, and South East Georgia, 100. The reduction, therefore, is not so great as has been anticipated under the influence of the price of cotton which prevailed last winter. The crop has not been materially injured by either frost or insects, that by frost being 2.6 per cent. and by insects 4.8. The advance in the price of corn last year has had the effect of counteracting the influence of the price of cotton in the distribution of areas devoted to the two crops. While there has been a material increase in the area devoted to cotton, there has not been a corresponding reduction in that devoted to corn.

OATS.

There was an increase in the area sown to oats but the fall sown were winter killed in some sections and have been subsequently affected by rust, so that the prospect of the crop compared to an average is only 79 for the State. In North Georgia, 95, in Middle Georgia, 96, South West Georgia, 61, East Georgia, 72 and South East Georgia, 59. The injury from rust in the whole State is reported as 22 per cent. On this subject, see notes from correspondents.

WHEAT.

There is a small increase in the area devoted to wheat over that of last year, but has been injured 31 per cent. by rust and 14 per cent. by insects, and hence, although the crop during the winter was very promising, its condition and prospects compared to an average on the first of May was only 63. See notes from correspondents on another page.

COTTON.

The improvement in the price received for the last crop of cotton has materially increased the area devoted to this crop in all of the sections of the State, except in Southwest Georgia. In North Georgia, the area, compared with last year, is 114; in Middle Georgia, 112; in Southwest Georgia, 104; in East Georgia, 110, and in Southeast Georgia, 134. For the whole State, 111. There being usually very little cotton planted in the Southeastern section, a small increase in the area, increases unduly the percentage. There having been no increase in the supply of labor, and no material diminution in the area devoted to other crops, there is risk of the cotton crop suffering for work unless the seasons are unusually favorable.

The crop was planted a few days earlier than last year in the southern part of the State, and from six to ten days later in Middle and North Georgia.

The heavy cold rains during the month of April, in the latter sections, have been extremely unfavorable to farming operations generally, and especially so to the cotton plant.

Sixteen per cent. more commercial fertilizers have been used on cotton than last year, and yet 27 per cent. of the whole area fertilized have been manured with home manure or composts. Forty-nine per cent. of the crop was up May 1st. The condition of the plant at that date, compared to an average, was 97.

In order to ascertain the relative area planted in cotton, compared to that devoted to grain crops, the following question was asked, viz: "Compared to the whole area in grain crops—corn, oats and wheat—(100 representing such area), what is the area in cotton?" The replies show that for every 100 acres in grain crops in Georgia there are this year 72 acres in cotton. In North Georgia, 53; Middle Georgia, 84; Southwest Georgia, 78; East Georgia, 69, and Southeast Georgia, 62.

COMMERCIAL FERTILIZERS

are applied throughout the State at the average rate of 131 pounds per acre. In North Georgia, at the rate of 147 pounds; in Middle Georgia, at the rate of 127 pounds; in Southwest Georgia, 120 pounds; in East Georgia, 140 pounds, and Southeast Georgia, 127 pounds.

The reduction in the quantity of commercial fertilizers applied per acre within the last five years have been most marked.

Farmers have learned, from experience, the risk of heavy applications in the drill injuring the cotton in times of drouth.

SUGAR CANE has the same area devoted to it as last year, but the stand is 3 per cent. better.

SORGHUM has experienced a small decrease in area. The early amber variety from which sugar has been successfully made in the West will no doubt stimulate the production of Sorghum in Georgia.

RICE is slowly gaining favor as an inland and an upland product. The area in lowland has been increased 3 per cent. and that in upland 5 per cent. The attention of the farmers of Georgia is invited to this crop as probably more certain than wheat and much more profitable.

CLOVER AND GRASSES.—There has been a small increase in the area devoted to these in Upper, Middle, and in North Georgia. Red clover, orchard grass

and herds grass are recommended—clover and orchard grass only on stiff clay, clay-loam and sand-loam soils with good clay foundation and herds grass on moist bottoms. In Middle Georgia nearly all correspondents recommend sowing in the fall and alone. A very few reporting good results from sowing with small grain.

In North Georgia many prefer sowing in the spring with oats.

The sentiment in favor of orchard grass as the best cultivated pasture grass for Georgia is almost universal.

FRUIT has been seriously injured in every section of the State. This is especially true of the peach and pear crops. Apples and grapes, though injured to some extent, promise an average crop. The average fruit prospect in the State is reported at 59 as compared to an average. In North Georgia, 57, in Middle Georgia, 54, in South West Georgia, 68, in East Georgia, 55, and in South East Georgia, 71.

There is very little doubt that these estimates, so far as they are based upon the peach crop, are too high, since the peaches have continued to grow since the frost, though fatally injured—many correspondents report them falling off rapidly.

The area devoted to orchards and vineyards has been increased in the State 12 per cent. during the last planting season.

The largest increase is reported in Southeast Georgia, where it is said to be 21 per cent. In East Georgia it is reported at 17 per cent. In Southwest Georgia, 13. In Middle Georgia, 10, and in North Georgia, 6.

Notwithstanding the immense nursery stock sold by the agents of Northern nurseries, the home nurseries found themselves unable to fill large orders early in the season. The demand for the last two seasons has been in excess of the supply.

Sheep, are reported 4 per cent. above an average condition and the drop of lambs one per cent. above an average. This is due to the mildness of the winter. The condition of work stock and supply of hogs in the State is reported at 100.

The Spring season has been favorable for farming operations in all of Southern Georgia, but quite unfavorable in Middle and North Georgia, on account of the excess of cold rain, which, notwithstanding the mild winter, have so far retarded vegetation as to make it unusually late.

NOTES FROM CORRESPONDENTS.

WHEAT AND OATS.

NORTH GEORGIA.

Chattooga.—Rust appears on all early sown crops—not much yet on late crops either oats or wheat.

Dawson.—No rust on oats—rust proof variety generally sown. The purple-straw wheats mainly sown. Warm winter favored injury by insects, and excessive rains have caused some rust.

Forsyth.—Oat crop looks fine, and no appearance of rust. January sown nearly as far advanced as fall sown. Grazing oats sown in the fall and rust proof in spring.

Wheat.—Preparation better than ever before. 20 per cent. of crop manured with cotton seed and compact. Purple straw sown principally, some Tappahannack and Fultz sown; rust just making its appearance; all injured, some by fly.

Gordon.—Rust proof, grazing and black oats mostly sown; fall sown badly injured; some spring oats are very fine.

Wheat.—Early sown injured by insects; preparation or soil seems to have made no difference; late sown the best.

Gwinnett.—Wheat.—Bill Dallas has no rust; Fultz has a little where early; other varieties in certain localities badly rusted; most of the crop not yet injured.

Wheat manured with cotton seed on cotton land generally escapes rust and makes a good crop.

Sowing when the ground is wet causes more rust than everything else.

Late sowing on light or sandy soils without a good clay subsoil, most injured by rust.

Oats.—None except the rust proof exempt from rust; the weather has more to do with producing rust than anything else; all look well at present.

The blue oat much sown and usually succeeds well.

Habersham.—One correspondent reports no rust in his section of the county; says the wheat now is as fine as he ever saw it, and is a good average crop *apparently*. Another says, owing to heavy rains in October, wheat in his section was sown later, and is seriously injured by rust. All injured by insects.

Oats.—One correspondent says: "No rust to date in my part of the county." Another reports 40 per cent. injury.

Hart.—Red rust-proof oats seem to be almost exempt from rust. Wheat injured by fly.

Madison.—Early sown wheat more injured by insects—late by rust. Purple Straw, Red May and Bowman favorite varieties.

Towns.—One says: "Very little wheat sown—entirely destroyed by rust." Another says: "Our wheat was never better than at this time. Oats sown in February and March look exceedingly well."

Union.—No rust in either wheat or oats.

Polk.—One says: "I sow winter grazing; never had any rust; always make a good crop when sown in August, September or October. They stand the winter, and can be grazed to 1st of April, and then make a good crop." Another says: "All except rust-proof varieties rust in wet springs."

MIDDLE GEORGIA.

Bibb.—Wheat.—Purple Straw the favorite variety; no rust.

Oats.—Red and yellow rust-proof grow well on any soil; no rust.

Butts.—Wheat sown on dark red land, well manured, has so far escaped; some rust, but with favorable weather an average crop will be gathered. No rust on oats.

Campbell.—All varieties rusted, but red flint least. No rust on oats.

Carroll.—Red rust-proof oats have never taken rust here. All wheat sown about 1st of November has escaped rust and fly so far.

Coweta.—All varieties of wheat and all sowings have rust on the blade.

Elbert.—Sowing when land is wet causes rust.

Fayette.—All wheat rusted; some think entirely ruined. Oats on sandy or gray soils injured, except the rust-proof and winter grazing varieties.

Fulton.—All oats sown early in January are looking well. Red rust-proof the best variety.

Heard.—No rust in oats—wheat almost a failure.

Henry.—Wheat on fresh land and gray land rusted worse. Early sown injured most by fly. Early red May doing better than late white varieties.

Fall sown oats generally rusting, the rust proof varieties excepted, spring sown not rusting.

Jasper.—All oats sown on gray, damp soil, are injured by rust, the red rust-proof variety, sown early, promises a very fine yield.

White or late wheat, early sown on rough, damp land seems to be mostly injured by rust.

Jones.—Sow red, rust proof—have heard of no rust in oats—neither soil nor preparation seems to have influenced rusting in wheat. All seriously injured.

Lincoln.—The black and the white varieties of oats seem to rust without regard to soil, time of sowing, or preparation, while the rust proof seems to be proof against all contingencies—have heard of no rust in them and they are "booming."

Wheat of the Bill Dallas and the blue stem varieties seem to escape rust whilst that brought from more northern latitudes suffers most, and this without special regard to soil, its preparation or time of sowing, while dry, rolling lands are more subject to depredations of the fly.

McDuffie.—All oats except the rust proof varieties badly rusted—they are fine; all wheat has rusted on the gray lands; the Dallas has rusted less than other varieties; wheat on red lands not much injured.

Meriwether.—All oats except the rust proof are now taking the rust; all wheat except a little on fresh land is rusting.

Monroe.—All varieties of wheat seem to have suff red alike on gray lands—that

on red lands has fared better. November sowing has suffered more than that sown in December; 90 per cent. of the oats in this county are rust proof—all other varieties injured more or less by rust.

Morgan.—Rust proof oats sown almost exclusively and free from rust, other varieties rusting; Bill Dallas wheat apparently free from rust; wheat sown after December 1st, does not seem to be much injured.

Newton.—All oats except the rust proof variety affected by rust; wheat sown early on grassy land has been seriously injured by fly; late sown is doing better.

Oglethorpe.—There seems to be very little, if any difference as to soil, preparation, or time of sowing as regards rust in oats. The white, known as the Jones oat, in this section seems to be worst injured, the black next, and the rust proof least.

Wheat.—No difference as to soil, preparation, or time of sowing; the purple straw seems to be most hardly and least injured.

Pike.—All varieties of oats except the rust proof have rusted. All varieties of wheat are more or less injured, the purple straw least.

Putnam.—All except the rust proof varieties of oats have rusted.

Rockdale.—Nothing but rust proof varieties of oats sown, and no rust; red purple straw and little white wheats have suffered least.

Talbot.—All varieties of wheat injured by rust and fly; that on grassy land has suffered most, and that following cotton least, but it has suffered on all classes of soil. All varieties of oats except the rust proof injured by rust, one correspondent says even they have been somewhat injured by rust and fly, but that they have improved very much within the last few weeks.

Taliaferro.—No rust on rust proof varieties, all others rusted; wheat sown early upon red land, highly fertilized, is least injured by rust; all late sown wheat is a failure.

Troup.—Neither the time of sowing nor the preparation of the soil, seems to have had anything to do with the rust in either wheat or oats; climatic influences alone seem to have produced it. The best prepared and richest lands seem to have suffered most.

Upson.—Early sown wheat and oats seem to have rusted worse; oats sown early in January are doing best, both have suffered most on foul land and least on cotton land.

Walton.—Jones and rust proof oats sown in fall—the Jones have rusted; all wheat more or less affected with rust.

Warren.—Black oats and rust proof varieties sown—the former rusted but none on the rust proof. Dallas wheat is least affected by rust, Red May next; all other varieties badly rusted.

SOUTHWEST GEORGIA.

Baker.—We have sown here exclusively the rust-proof. Fall, winter and spring sown are all affected, except a few spots. Injured more on old light soils than on fresh or more fertile spots . . . We regard the insect as the immediate cause of rust in wheat and oats.

On all soils, every variety, regardless of time of sowing, has rusted, except when highly fertilized.

Brooks.—The red rust-proof oats, when mixed with other varieties, has rusted;

but the greater damage has been inflicted by an insect. Spring sown oats are almost a failure.

Clay.—All our oats are rusting, without regard to soil, though I believe *those on sandy soils are worse*. Fall oats injured more than January.

Dougherty.—I am satisfied that the rust is caused by lice or some kind of insect that has sucked the oats.

My first and latest sowing suffered most from rust. There are places, acres in extent, on which the oats are entirely dead. Oats sown on stiff land after cotton suffered least; while those on sandy land after corn will make nothing.

Early.—It is impossible to attribute the failure in oats to any other causes than the mild winter and lice—the latter never seen here before.

Houston.—In this section oats were injured more by insects than by rust. . . . I have no doubt that insects or fly was the cause of rust or dry mould in wheat, the weather not being cold enough to kill them.

Lee.—Good manuring is an entire preventive of rust in oats, unless too thick, say over three bushels per acre, on good land. The trouble is most undoubtedly caused by depredations of insects, and oats on poor land can't hold up under it.

Marion.—No rust in my oats where sown in the fall on land that has clay with in eight or ten inches of the top. Will make a full crop, but hear much complaint from those who sowed on old sandy land that had much old grass on it. * * Wheat sown on corn land that was foul with old grass and pea vines, and of a sandy character, has rusted badly, fertilized or not; but on stiff clay lands, clean of grass, and that had been in root crops last year, no rust or other injury has resulted.

Mitchell.—All oats seriously injured by some kind of insect. Those who have examined the insect, say that is similar to lice in cotton. Manured land suffered least. Poor land will make nothing.

Sumter.—Oats on cold, open, sandy land, especially if bare of vegetable matter are worse injured; also those from seed that were cut before ripe. Highly manured oats, composts or guanos, have come out.

Terrell.—I think the warm winter, and lice and other insects are the causes of the rust in this section. The roots are covered with lice similar to those on collards when seeding. It is really not rust; the leaves are red and dried up.

EAST GEORGIA.

Burke.—Badly drained land, poorly broken and pulverized, and seed slovenly put in, is the chief cause of rust here. No variety exempt under these conditions. Oats drilled and cultivated, and well fed with ammonia and phosphoric acid are good.

Sereven.—The variety known as Mexican rust-proof seems to be exempt; and, where rust appears it seems to be owing to defective seed.

Twiggs.—Nearly all of the spring oats, except rust-proof, have more or less rust. Those sown very early in the fall are good.

The opinion of most farmers is, that rust was caused by dry, warm winter, followed by excessive rains, as rust has now nearly disappeared.

SOUTHEAST GEORGIA.

Clinch.—The mild, warm and dry winter, and the attacks of a small, green louse, similar to the cotton louse, seem to have conspired to produce rust. It is the first time I have seen rust in the "rust-proof" yellow oat (with black beard.)

RUST IN OATS.

Some correspondents in Southern Georgia seem discouraged and despondent in view of the fact that the variety of oats called *rust proof*, which had come to be so highly valued on account of its exemption from rust, appears at last to have lost its peculiar hardiness in this respect. They are apprehensive that the seed from the present crop will be unfit for sowing next season, and are now anxiously inquiring for *rust proof seed oats*. I have no information of any distinct variety that has so high a reputation in this respect as the red or yellow rust proof, which has so recently disappointed the expectations of many farmers. The reports of correspondents justify the belief that the rust proof oat has been deteriorated by allowing the seed to become mixed with those of other varieties, having less ability to resist rust and other diseases, whereby a *mongrel* variety has been originated having the general appearance of the rust proof, but lacking in the most highly valued quality of the latter. This result is not contrary to frequent experience in cross-breeding of animals and cross-fertilization of plants, especially when allowed to occur at hap-hazard—without judgment.

Some correspondents state that those farmers who have been very careful in preserving the purity of the original seed, have no rust in their crops.

The remedy is simple. Seed must be selected that have escaped rust, and the original type of the rust proof variety must be re-established. This may be done with great assurance of success, by selecting, from a field that is infested with rust, such heads as are entirely free from it and are satisfactory in other respects. Even by this plan, every farmer may in a few years re-establish the genuine rust-proof oat. In the meantime, seed from the present crop may be sown next season, with probably no more risk of rust than if the present crop had not been affected with it. It is altogether probable that in the localities where the rust has been most damaging to the crop, the season has been peculiarly favorable for its development; and such a season may not occur in many years. It is wise, however, to provide against such a recurrence, as the oat crop is growing into such importance in Georgia that the loss of a single crop, or its serious injury, would be a public calamity.

Another fact is suggestive: Some correspondents say that on *highly fertilized* and *lean* lands, the oats have escaped with little or no injury—an illustration of that exemption from disease and insect depredation which is often the result of *high culture*.

Very respectfully,

J. T. HENDERSON,

Commissioner of Agriculture.

Crop Report.

TABLE No. I.—Comparative Areas and Condition of Crops, etc., May 1, 1880.

NORTH GEORGIA.

[illegible]

Paulding.....	93	95	105	37	116	93	87	117	...	10	100	37	95	100	95	...	100	...	109	100	75	10	100	100	100	110	15
Pickens.....	95	100	107	60	105	87	83	115	...	10	115	62	100	53	150	...	95	...	...	...	...	...	...	...	...	...	13
Polk.....	110	75	100	45	75	140	150	110	...	10	150	25	75	40	125	...	150	...	100	100	60	5	125	112	125	100	13
Rabun.....	100	100	100	120	100	107	55	112	...	11	17	50	95	15	150	...	102	...	10	110	65	5	109	108	80	113	13
Town.....	100	100	100	120	100	107	55	112	...	110	110	50	100	100	150	...	100	...	100	100	125	15	90	90	75	12	10
Walker.....	90	100	100	25	115	90	90	125	...	150	150	60	100	30	12	...	100	...	100	100	100	100	100	100	100	98	10
White.....	94	98	100	45	100	8	60	125	...	...	...	...	...	...	...	...	...	...	100	100	100	100	100	100	100	98	10
Whitfield.....	97	96	100	47	95	98	81	114	...	11	116	32	94	53	147	...	92	...	105	10	102	57	101	100	103	100	10
Average.....	97	96	100	47	95	98	81	114	...	11	116	32	94	53	147	...	92	...	105	10	102	57	101	100	103	100	10

MIDDLE GEORGIA.

Baldwin.....	100	93	122	75	85	105	...	105	...	10	125	30	80	75	150	100	100	...	120	...	50	22	100	110	90	110	12
Bibb.....	105	95	130	90	85	100	75	105	...	12	130	65	115	110	150	140	115	...	...	...	30	5	...	...	...	125	10
Butts.....	100	110	98	25	91	100	90	105	...	10	100	100	100	100	100	100	100	...	...	...	100	10	110	105	105	100	12
Campbell.....	93	92	105	27	85	87	60	110	...	10	115	8	90	125	14	...	...	...	...	...	40	5	97	97	105	80	29
Carroll.....	83	94	115	32	107	115	75	130	...	12	130	10	87	85	150	100	100	...	...	...	100	100	40	8	115	102	103
Clarke.....	100	90	100	25	100	75	105	5	...	10	118	20	90	40	150	100	100	...	...	...	60	8	...	...	...	100	11
Clayton.....	92	97	100	40	105	95	62	110	...	5	122	10	100	97	160	120	100	...	...	...	62	8	100	100	95	100	14
Columbia.....	95	92	115	82	...	95	115	...	...	5	122	10	100	60	122	...	20	...	...	...	50	7	100	100	100	100	13
Coweta.....	92	98	103	25	111	97	60	110	...	12	130	10	100	60	122	...	20	...	...	...	50	1	100	100	100	100	12
DeKalb.....	90	100	120	30	80	100	90	120	...	10	120	10	100	80	150	...	100	...	...	...	100	10	100	100	100	100	12
Douglas.....	100	94	100	30	80	95	80	115	...	10	125	20	90	93	125	...	73	...	...	...	75	10	105	100	100	105	12
Elbert.....	100	94	125	65	80	115	50	115	...	12	125	25	15	70	14	...	...	...	...	...	101	105	105	100	100	100	19
Fayette.....	85	97	100	27	102	100	55	115	...	15	115	22	100	70	137	...	100	...	...	...	100	100	100	100	100	105	12
Fulton.....	107	93	100	50	90	100	70	130	...	5	110	10	100	40	100	...	30	...	...	...	20	50	...	...	...	100	18
Greene.....	80	95	110	90	105	120	35	105	...	5	110	5	100	40	100	...	30	...	...	...	70	2	100	100	100	100	15
Hancock.....	115	115	150	50	110	120	60	110	...	10	100	50	100	50	150	75	100	...	...	...	50	10	120	125	120	140	15
Harris.....	85	109	100	80	100	100	115	...	...	10	125	5	110	55	100	100	96	75	...	...	50	...	...	...	...	115	100
Heard.....	95	87	130	107	102	93	50	130	...	3	112	30	100	115	125	...	42	...	...	...	70	10	87	90	112	97	15
Henry.....	100	102	115	62	107	100	72	105	...	5	115	25	100	95	100	100	...	100	...	...	75	5	107	102	100	112	12
Jasper.....	110	100	200	50	100	150	40	100	...	10	100	25	100	45	100	100	100	...	...	...	50	10	100	110	80	75	12
Jones.....	110	90	120	75	105	100	50	100	...	10	110	25	100	45	100	100	100	...	...	...	50	10	100	100	100	75	12
Lincoln.....	97	95	117	87	108	110	65	113	...	10	127	9	100	60	125	...	100	...	...	...	75	10	107	107	115	105	13
McDuffie.....	83	95	115	70	112	97	40	115	...	10	113	33	90	45	150	102	96	90	95	...	75	10	105	102	94	90	13
Meriwether.....	85	100	105	50	85	100	50	107	...	10	12	100	80	125	...	...	...	...	...	...	75	5	100	100	100	90	13
Monroe.....	90	100	115	47	103	105	50	110	...	10	117	13	100	70	112	110	110	...	...	...	62	17	102	100	95	100	12
Morgan.....	92	85	130	75	103	125	35	110	...	10	110	15	98	110	150	100	100	...	...	...	65	5	108	101	90	102	13
Newton.....	90	103	117	50	110	100	45	120	...	12	120	25	100	45	137	...	50	...	...	...	20	22	105	100	122	85	12
Oconee.....	100	90	125	45	80	125	50	110	...	...	...	...	...	...	...	...	...	...	...	...	50	7	100	100	100	95	12
Oglethorpe.....	92	98	105	40	110	108	50	105	...	5	117	25	103	70	115	110	120	80	100	...	50	7	100	100	100	99	14
Pike.....	100	103	117	65	86	115	74	104	...	15	115	20	102	108	130	...	90	...	...	...	58	8	115	102	90	98	14
Punam.....	98	110	110	38	100	98	65	105	...	8	110	23	100	90	112	...	100	...	...	...	40	7	100	95	100	90	13
Rockdale.....	93	100	115	35	125	95	60	120	...	15	9	33	98	75	130	100	75	...	...	...	60	25	130	10	112	98	13
Spalding.....	97	102	107	57	70	95	40	107	...	125	...	27	98	90	110	102	100	70	90	...	50	15	105	100	100	100	13
Talbot.....	97	102	107	57	70	95	40	107	...	125	...	27	98	90	110	102	100	70	90	...	50	15	105	100	100	100	13

TABLE No. I.—Continued.
SOUTHEAST GEORGIA.

COUNTIES.	Corn.		Oats.		Wheat.		Cotton.						Sugar Cane.		Rice.		Clover & Grasses.		Fruit.		Live Stock.				Date of last killing frost.						
	Acreage, compared to last year.	Stand, compared to good stand.	Acreage, compared to last year.	Per cent. sown in fall.	Condition and prospect, compared to average.	Acreage, compared to last year.	Average time of planting, compared to last year.	Days early.	Days later.	Commercial fertilizers used on this crop, compared to last year.	Per cent. of the area fertilized with home manures and composts.	Condition of plants, compared to an average.	Area in cotton compared to whole area in corn, oats and wheat—latter 100.	Average number lbs. commercial fertilizer applied, per acre, to cotton.	Area, compared to last year.	Stand, compared to average.	Sorghum, area compared to last year.	Area—lowland—compared to last year.	Area—upland—compared to last year.	Area in clover and grass, compared to last year.	Condition, compared to average.	Fruit prospect—apples, peaches, pears & grapes—comp'd to average.	Per cent. added to area in orchard during last winter.	Condition of sheep, compared to an average.		Number of lambs, compared to an average.	Condition of work stock, compared to an average.	Stock of hogs, all ages, compared to last year.			
Coffee.....	100	95	125	90	20	.....	85	10	.....	80	50	90	15	100	100	125	.....	125	.....	.....	.....	100	25	95	75	100	100	100	Decem'r	26
Echols.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Effingham.....	100	90	110	50	60	110	same	120	50	90	25	200	100	100	100	125	75	25	100	100	100	100	100	100	April	13
Glynn.....	100	80	200	100	50	.....	110	same	.....	.....	10	100	4	.....	100	100	100	.....	100	100	.....	.....	100	50	75	50	100	125	.....	13
Liberty.....	100	95	125	60	50	.....	110	same	.....	.....	.....	.....	.....	.....	100	100	100	.....	100	110	.....	.....	.....	100	100	100	100	110	Mar	30
McIntosh.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pierce.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wayne.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Average.....	100	95	118	71	59	.....	134	2	.....	89	31	97	62	127	97	106	100	108	106	106	.....	71	21	97	89	99	104	.....	.....	.....
North Georgia.....	96	100	100	47	95	.....	81	11	116	116	32	94	53	147	.....	.....	95	96	105	105	102	57	6	101	100	100	103	103	.....	.....
Middle Georgia.....	95	97	115	42	96	.....	105	60	112	6	118	28	98	84	127	104	99	8	96	106	104	54	10	104	102	102	102	102	.....	.....
Southwest Georgia.....	10	93	110	68	61	.....	101	5	.....	115	80	10	78	120	10	109	6	6	103	100	100	68	18	107	100	100	100	100	.....	.....
East Georgia.....	10	98	102	7	7	.....	101	same	.....	122	92	6	6	.....	95	9	8	0	100	100	100	5	11	107	100	100	100	100	.....	.....
Southeast Georgia.....	1	35	100	1	5	.....	131	1	.....	89	31	97	62	127	97	106	100	100	100	100	100	5	11	107	100	100	100	100	.....	.....
Average 1880.....	95.2	96	109	58	79	.....	111	.....	.....	116	27	97	72	131	100	103	83	103	105	101	102	59	12	104	101	100	100	100	.....	.....
Average 1879.....	100	94	102	.....	90	.....	101	.....	.....	92	29	92	.....	.....	.....	.....	84	103	103	90	94	55	18	.....	.....	.....	.....	.....	.....	.....

RECAPITULATION.

TABLE II.

Synopsis of Weather Reports from January 1st to April 30th, 1880.
NORTH GEORGIA.

STATIONS.	JANUARY.				FEBRUARY.				MARCH.				APRIL.				Latest Spring Frost.	
	Temperat're				Temperat're				Temperat're				Temperat're					
	Maximum.	Minimum.	Mean.	Rainfall.	Maximum.	Minimum.	Mean.	Rainfall.	Maximum.	Minimum.	Mean.	Rainfall.	Maximum.	Minimum.	Mean.	Rainfall.		
Canton.....	68.0	27.0	50.4	2.30	66.0	24.0	46.5	3.40					6.50	80.0	30.0	59.0	9.40	April 11th.
Ellerslie.....	65.0	27.0	48.0	3.37	66.0	21.0	44.0	3.35	69.0	27.0	50.0		9.75	86.0	33.0	62.1	15.90	April 12 h.
Gainesville....	74.0	30.0	52.9	2.6	71.0	25.0	49.0	2.95	72.0	34.0	54.3		9.75	86.0	33.0	62.1	0.59	April 12th.
Leo (White Co) ..	69.0	27.0	51.2	1.72	72.0	26.0	47.3	3.79	73.0	33.0	54.0		8.31	82.0	36.1	62.2	0.59	April 12th.
Mt. Airy.....	70.0	30.0	51.8	3.32	72.0	26.0	48.8	2.70	69.0	39.0	53.3	11.30	84.0	36.0	62.0		6.36	April 12th.
Rabun Gap	69.0	21.0	46.7	3.75	70.0	15.0	43.1	4.55	74.0	23.0	50.3	12.27	81.0	25.0	57.6		6.90	April 13th.
Rome.....	71.0	31.0	52.9	2.41	73.0	26.0	49.4	2.92	75.0	33.0	55.8	10.40	86.0	33.0	63.1		9.25	April 13th.
Toccoa.....	73.0	28.0	53.3	3.32	78.0	33.0	49.6	6.19	76.0	39.0	55.4	10.41	86.0	34.0	64.8		10.81	April 12th.
Means.....	69.8	27.6	51.1	3.23	71.0	23.2	47.2	3.73	72.6	32.6	53.3	9.85	84.0	31.9	61.5	8.46		

MIDDLE GEORGIA.

Athens.....	68.0	32.0	52.7	2.6	61.0	30.0	48.1	3.17	70.0	36.0	51.8	9.11	89.0	36.0	58.9	7.87	April 12th.
Atlanta.....	71.0	30.0	52.8	2.62	74.0	23.0	49.0	3.02	79.0	34.0	55.0	11.44	83.0	33.0	62.0	5.75	April 12th.
Carrollton.....	71.0	31.0	53.4	2.20	75.0	27.0	50.2	2.42	77.0	33.0	56.6	9.25	88.0	35.0	61.0	5.27	April 12th.
LaGrange.....	72.0	31.0	52.7	1.84	75.0	25.0	50.3	3.67	81.0	35.0	57.9	11.62	86.0	37.0	61.3	3.50	April 12th.
Macon.....	78.0	40.0	57.0	1.05	80.0	32.0	56.0	2.19	80.0	40.0	60.0	5.68	88.0	38.0	65.6	4.35	April 12th.
Oxford.....	71.0	32.0	53.2	2.7	72.0	33.0	49.4	2.35	80.0	34.0	55.4	11.0	86.0	34.0	63.2	7.05	April 12th.
Thomson.....	75.0	35.0	55.1	1.10	82.0	39.0	54.9	2.95	84.0	38.0	59.7	6.65	89.0	34.0	66.2	4.50	April 12th.
Woodbury*.....	76.0	32.0	57.0	0.77	77.0	31.0	53.6	3.06	82.0	39.0	61.4	8.72	88.0	39.0	66.9	3.00	April 12th.
Means.....	72.7	28.7	54.3	2.4	75.0	29.0	51.4	2.85	79.1	36.1	57.1	8.55	86.6	35.7	63.4	5.16	

SOUTHWEST GEORGIA.

Americus.....	82.0	35.0	61.1	1.25	80.0	34.0	56.5	4.75	86.0	39.0	65.3	3.50	89.0	37.0	72.4	4.10	.....
Nashville.....	78.0	33.0	58.0	3.25	81.0	34.0	59.0	3.00	88.0	45.0	68.2	4.20	88.0	46.0	71.0	2.00	.....
Thomasville....	77.0	40.0	59.3	4.47	81.0	34.0	57.6	3.14	85.0	41.0	67.6	2.90	87.0	44.0	68.5	1.39	April 12th.
Means.....	79.0	39.7	59.5	2.99	80.0	34.0	57.7	3.63	86.3	41.7	63.7	3.53	88.0	42.3	70.6	2.50	

EAST GEORGIA.

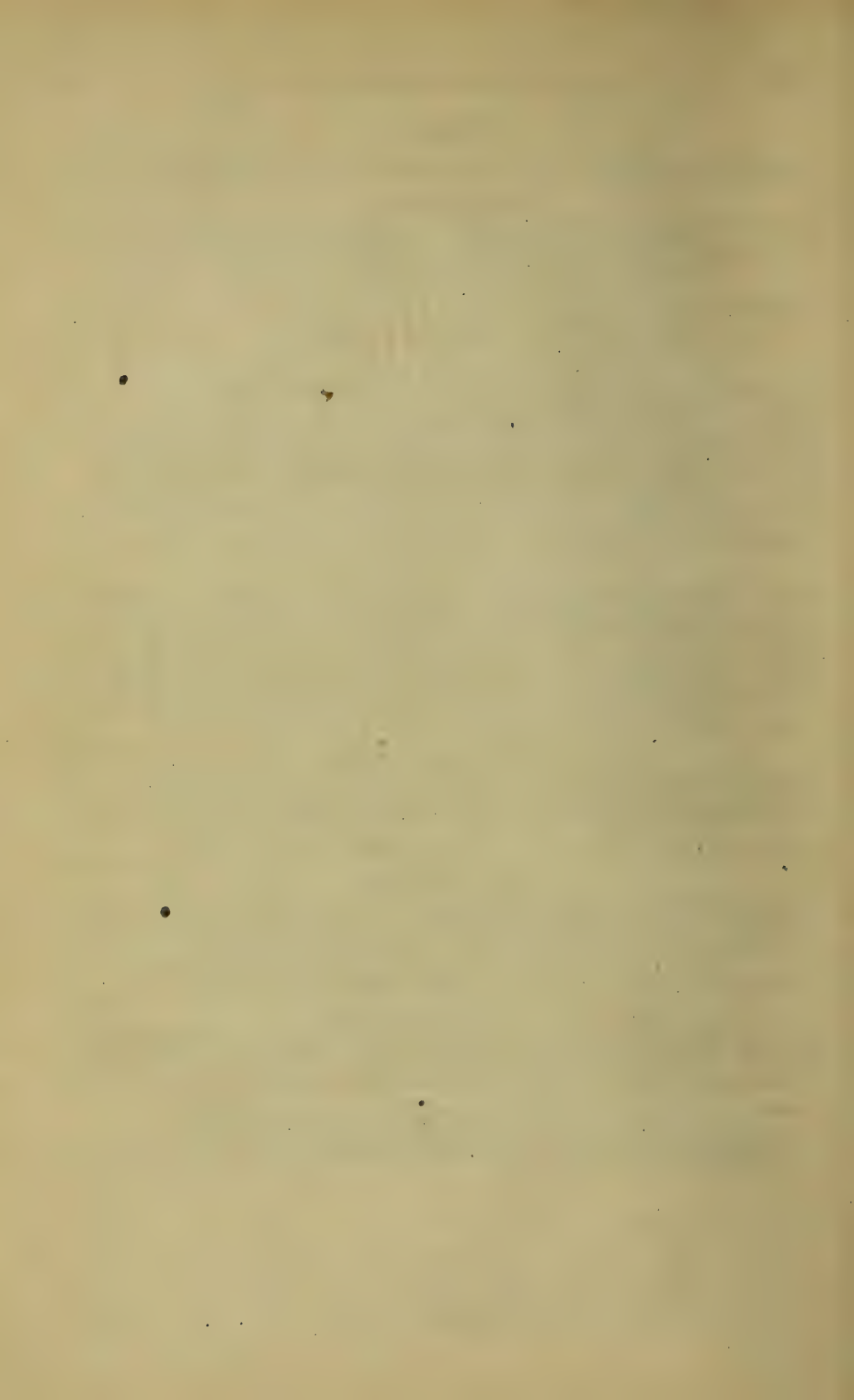
Angusta.....	73.0	34.0	56.2	2.30	77.0	30.0	53.0	2.05	80.0	33.0	57.0	5.90	85.0	33.0	60.5	5.00	April 13th.
McRae.....	77.0	34.0	58.6	1.7	82.0	29.0	54.7	5.2	86.0	.....	.....	2.00	94.0	45.0	.....	2.00	.....
Ogeechee.....	75.0	36.0	59.2	2.58	78.0	36.0	57.7	2.40	80.0	44.0	62.7	2.50	85.0	43.0	66.3	6.40	April 12th.
Swainsboro....	77.0	32.0	57.4	2.30	80.0	34.0	54.6	2.70	87.0	36.0	62.3	2.44	90.0	42.0	68.9	4.80	.....
Means.....	75.5	34.0	57.8	2.50	79.0	32.2	55.0	3.09	83.2	37.7	60.7	3.21	89.7	40.0	64.7	3.9	

SOUTHEAST GEORGIA.

Blackshear....	87.0	38.0	61.0	3.51	84.0	39.0	64.7	3.80	86.0	51.0	67.1	1.08	93.0	67.0	74.1	1.61	February 4th.
Blackswick....	75.0	42.0	60.8	1.80	78.0	38.0	57.0	4.21	88.0	47.0	66.0	1.20	89.0	44.0	71.0	1.26	February 4th.
St. Mary's.....	79.0	41.0	60.4	2.83	81.0	39.0	58.5	4.80	88.0	43.0	67.4	1.88	90.0	44.0	70.0	1.91	.....
Walthourville..	75.0	35.0	58.9	3.0	82.0	35.0	56.6	3.10	86.0	40.0	65.1	1.10	88.0	40.0	68.6	2.01	April 13th.
Means.....	79.0	39.0	60.3	2.78	81.0	39.0	59.2	3.93	85.7	45.2	66.4	1.29	90.0	49.0	71.7	1.69	

* For State. 73.9 31.9 55.3 2.8 76.1 29.7 52.5 3.40 79.8 37.4 58.7 64.4 86.9 38 35.2 5.03

* Meriwether county.



Special Circular No. 6. }
NEW SERIES. }

REPORT OF GROWING CROPS, ETC., FOR THE MONTH
OF MAY 1880.

RETURNABLE JUNE 1st, 1880.

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA., May 12, 1880.

DEAR SIR—Please answer the following questions **on the 1st day of June**, or a few days before, if necessary, and mail promptly, so that your report may reach this office **by the Third of June**.

Answer every question, that will permit of it, in numbers indicating per cent.

An AVERAGE CROP, or AVERAGE CONDITION, or anything with which comparison is made, is always taken as 100. Thus, if the corn crop at any time is 10 per cent. better than last year, or 10 per cent better than an average, it should be reported as 110 in each case; and if ten per cent. below these standards, it should be 90. Never report "10 per cent. better" or "10 per cent. worse," but 110 or 90, as the case may be. So avoid vague comparisons, such as, "some better," "hardly so good," "above an average," etc.

In making up your answers, let them apply to the whole county in which you reside, or as far in every direction as your knowledge may extend, *not simply to your own farm.*

If a crop about which questions are asked is not grown in your county, use the character **X**. If you have not sufficient data to make an approximate estimate, leave the space blank.

Very Respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

I. For what county do you report?.....county.

II. Your name?

III. Your post-office?

CORN.

1. Condition as to stand, size, compared to an average?per cent.
2. Condition compared to this time last year?.....per cent.

OATS.

3. Yield compared to average?.....per cent.
4. To what extent injured by rust?.....per cent.

WHEAT.

5. Yield compared to average?.....per cent.
6. To what extent injured by rust?.....per cent.
7. If any, what variety has escaped rust?.....
8. What variety has given the best results?

COTTON.

9. Stand (1st June) compared to average?.....per cent.
10. Condition as to size, work, compared to average?.....per cent.

CLOVER.

11. Yield of clover hay, compared to an average?.....per cent.

SUGAR CANE.

12. Stand compared to *good* stand?... ..per cent.
13. Size and condition compared to an average?.....per cent.

POTATOES.

14. Prospective yield of Irish potatoes, compared to an average?.....per cent.
15. Area in Sweet potatoes, compared to last year? . . .per cent.
16. Condition compared to an average?.....per cent.

MISCELLANEOUS.

Condition compared to average, of--

17. Rice?.....per cent.

18. Ground peas?per cent.

19. Chufas?.....per cent.

20. Melons?per cent.

FRUIT.

21. Fruit prospect compared to average?per cent.

STOCK.

22. Clip of wool compared to last year?.....per cent.

23. Price obtained by farmer for common unwashed wool?...per cent.

SEASONS.

24. Have the seasons been favorable or unfavorable, during May?.....

NOTE.—Report (on next page) any facts of general interest to farmers of the State. Only short, pointed notes will be published.

REQUEST —Having answered all the questions, please fold this report as you received it, and fill the blank on the back.

.....County.

.....Reporter.

MAY CROP REPORT--1880.

Circular No. 7. }
NEW SERIES. }

Consolidation of the Reports of Crops, Etc., FOR THE MONTH OF MAY, 1880.

RETURNED TO THE DEPARTMENT OF AGRICULTURE JUNE 1, 1880.

DEPARTMENT OF AGRICULTURE, ATLANTA, GA., June 8, 1880. CORN.

The crop of corn generally in the State is reported very promising on upland, but much difficulty has been experienced in securing a stand on bottom lands, on account of overflows in some sections, and bud worms and cut worms in others. Usually, mild winters, that are interspersed with cold spells, are destructive of insects; but the latter part of the last winter was without such spells, and hence the insects that were brought out early from their winter quarters were not killed, but lived to propagate their kind. The result is that they have been unusually destructive to vegetation this spring.

Many correspondents complain of the necessity of repeated replantings, which have given many fields of corn an uneven appearance. In some portions of North Georgia corn was planted unusully late, on account of continued rains at the usual time of planting.

The condition of the corn crop compared to last year is 94 in North Georgia, 101 in Middle Georgia, 106 in Southwest Georgia, 105 in East Georgia, and 108 in Southeast Georgia.

The season has, however, been so propitious for its early growth, causing such a succulent condition, that it is apprehended that should drouth occur during this month its effects will be disastrous. Seasonable weather during the early growth of plants induces root formation near the surface of the ground, where they suffer more than when the principal root formation is induced by early drouth further below the surface.

Should the weather continue favorable, the present indications point to an abundant crop of corn in the State.

OATS.

The rust-proof variety of oats has sustained itself this season, the most propitious for the growth of the rust fungus known for many years, except in the extreme Southern part of the State, where even this rusted, except under the most

favorable circumstances. Other varieties have almost invariably proved total failures. It has been difficult for correspondents to make reports, satisfactory even to themselves, as to the yield of the oat crop, because of the absence of accurate information as to what part of the crop sown was rust-proof. The reports are almost unanimous in all sections, except in the Southern tier of counties, in reporting the rust-proof varieties almost, if not entirely, exempt from rust, while all other varieties have been utterly ruined by rust. The reports of yield compared to an average are, in North Georgia, 54, the lowest because the rust-proof varieties are less sown there than elsewhere. In Middle Georgia, 74; Southwest Georgia, 63; East Georgia, 75, and Southeast Georgia, 61; average for the State, 68. The results of this year's experience demonstrate the importance of a judicious selection of seed. *The rust-proof varieties are all bearded.* Farmers should be guided by this in selecting seed for the next crop.

WHEAT,

as a crop is a failure in the State this year. Georgia is not, strictly speaking, a wheat State, though under favorable circumstances as to seasons, soil, preparation and fertilization, good crops are made. Under these circumstances it is a matter of utmost importance that judicious selection of the most hardy varieties should be made. Wheat in our climate is subject to two serious casualties, the rust and fly, and to a third—spring frosts, to avoid which increases the risk of rust. The true policy for wheat-growers in Georgia is to select stiff lands under clean culture and the early hardy varieties. Early sowing is hazardous on account of the fly and late sowing, except of very early varieties, are apt to rust. Early varieties sown after vegetation, and the fly with it, has been killed by frost, ordinarily prove successful. Late varieties seldom succeed. The varieties which have given best results this year are, Red May, Red purple straw, Dallas and some of the bearded varieties. The estimate for the State is only fifty-two; and it is thought that the half-bushel and the scales will reduce it still lower, as the effects of rust cannot be fully realized until the wheat is threshed. The mild winter has enabled the fly to continue its depredations during the seasons when it is usually dormant. The fly and rust have been the principal agencies in the destruction of the crop.

COTTON

may be said to be promising at this time, the stand being reported at one hundred compared to an average and "condition as to size and work," ninety-six. It will be remembered that in a large part of the State the planting was some ten days later than usual and hence in that part of the State the size could not be expected to be large, while there being about sixteen per cent. more planted it has been impossible, during a favorable May to work the crop thoroughly, since the supply of labor has not increased in proportion to the increased area planted. Many correspondents report—as will be seen by "notes from correspondents,"—day labor scarce and commanding unusually high prices. The plant, however, is generally reported in a healthy condition.

CLOVER

and the grasses where cultivated are reported unusually fine on account of the moist spring which has been favorable to their growth. The "yield of the clover compared to an average" is reported as one hundred and five, or five per cent.

above an average. No question was asked about orchard grass which is superceding clover and the other grasses, but many correspondents report it as very fine.

SUGAR CANE,

as to stand, is one per cent. below a good stand, but as to size and condition compared to an average is one hundred.

IRISH POTATOES,

notwithstanding the injury from frost are making one per cent. above average yield.

SWEET POTATOES

show an increase of five per cent. in area and four per cent. improvement in condition compared to an average.

RICE

is annually attracting more attention in the interior where the upland rice is being cultivated to some extent.

GROUND PEAS,

Chufas and Melons are all below an average condition.

FRUIT

prospect is reported at only 43 per cent. of an average crop. This is quite a reduction since last month, as was anticipated, since a large portion of the fruit which remains after a severe frost usually drops from the trees before maturity.

The prospect in North Georgia is reported at 50, in Middle Georgia 39, in Southwest Georgia 42, in East Georgia, 40, and in Southeast Georgia 46. This involves a serious loss to the State, since the cultivation of fruit for market has, within the last five years, assumed large proportions.

THE CLIP OF WOOL

has been 3 per cent. better than last year. This is probably due more to the mildness of the winter and the resulting good condition of the sheep than to any material increase in their number. The average price at which unwashed wool has sold is 31 cents, the price varying in different sections of the State. In North Georgia the average price is 30 cents, in Middle Georgia 27 cents, and in Southwest, East and Southeast Georgia 35 cents. If the sheep averaged only three pounds per head, this will make a very handsome profit on the value of the sheep and the cost of keeping them.

THE GENERAL OUTLOOK

in the State is, at present, very favorable for the staple crops. With the exception of the small grain crop and fruit, the outlook is very promising. Some correspondents report plowing up the damaged oats and planting the land in corn and peas. If this course is generally pursued, the loss of the oat crop will not be very seriously felt. It is not too late to repair the loss to some extent by saving hay from the natural grasses, fodder, corn and field peas. Large crops of sweet potatoes may be planted by using the vines from the early planting. The sweet potatoe is not fully appreciated as a food for stock. It is about nine times as nutritious as turnips and much more easily and cheaply produced in the South.

Very respectfully,

J. T. HENDERSON,

Commissioner of Agriculture.

NOTES FROM CORRESPONDENTS.

NORTH GEORGIA.

BANKS.—“Nearly all the best bottom land is still unplanted in corn. Fall sown oats are promising a good yield. Spring sown are not heading—are low and rusty. Sugar cane and (upland) rice are being introduced with quite favorable results. Since the last report wheat has improved but oats have fallen behind all expectation. There was drouth ending the 20th of May. Good rains now and prospects looking up.”

One says: “Rust-proof oats very good, black very sorry, and yellow an entire failure.”

BARTOW.—Acreage in cotton too great for a wet spring, coupled with great scarcity of labor, much of the cotton must be injured and some lost. Much of the corn not yet planted, especially on bottom lands. That planted is being injured by the heavy rains.

CHATTOOGA.—“Rather poor prospects for corn, owing to so much rain on low lands. Wheat seriously injured by rust and insects. Oats almost a failure on account of rust. Those who have time are plowing up and planting peas. Early planted cotton good—late planting poor stand.”

CHEROKEE.—“Hundreds of acres of spring oats are so entirely killed that they look as though they would burn if set on fire. On very high, rolling lands the fall sown oats will make an average crop. The same is true of wheat on such lands. There is no peach crop, except on elevated lands and southern exposures.

COBB.—Oats have rusted more than ever known before in this county—mostly the grazing oats sown in spring—those sown in the fall will make a crop. Farmers who counted upon outside labor for chopping cotton have had a hard time—risky business and demoralizing to the labor.

FLOYD.—Late rains have helped oats, but the yield will be fully one-third short. Wheat may average five bushels per acre. Cotton never looked better at this date, nor was there ever a better stand.

GORDON.—Poorest wheat crop in thirty years. Farmers well up with their work.

GWINNETT.—“Farmers have planted large crops, and are buying few provisions on time. Prospects generally good. The farmers are in high spirits, not caring who is President or Governor, but making rapid strides towards independence. The rust-proof oats alone have escaped rust. The dry spell in May has caused wheat to look well; think a half crop will be made.”

Another says: “The farmers are in better condition than for years. Most of them in the northern part of the county have corn for sale, with few buyers; most of them also have money brought over from the last cotton crop; but few are going in debt. Labor is scarce, and commands 75 cents per day, cash, with partial board for first class hands; cheaper for common laborers.”

HABERSHAM.—“Recent freshets have injured the corn crop very materially, so that most of the bottoms will have to be replanted.”

Worms have been more destructive this year by several hundred per cent. than ever known before in this section, and we would like exceedingly well to find out some effectual preventive or remedy for this great annoyance and destruction.

MADISON.—Farmers are generally in a more favorable condition than usual. No wheat in the county has entirely escaped rust.

MURRAY.—Farmers began planting cotton very early, when planting was suspended for two weeks by rain. The result is some very late planting of cotton and corn. Since May 1st, wheat and oats have suffered greatly from rust. Wheat now being harvested.

UNION.—“Prospect good for wheat. Red rust plenty, but not seriously injured yet.”

WALKER.—“Heavy rains in April caused a bad stand of cotton then planted. Much of the fruit, especially peaches, has dropped from the trees, so that the crop will not be nearly so good as reported last month.”

WHITFIELD.—“But little wheat will be harvested. I have sixty acres in wheat and oats which I have offered to any of my neighbors free if they will harvest them.”

“Throughout the county there is the best stand of cotton we have ever had. Labor to work it is all that is required to make us a cotton growing and money making people.”

MIDDLE GEORGIA.

BALDWIN.—Both corn and cotton are looking well where they have been properly cultivated.

BIBB.—Oats, short, but have exceedingly fine heads. Labor scarce—cotton choppers receiving seventy-five cents per day.

BUTTS.—The wheat crop has not all been gathered, but we cannot report more than half a crop. Fly injured it more than rust. All varieties of oats, except rust proof, are a total failure—not one cut. Very few peaches and they are falling off. Apple prospect above an average. There was too much rain during the first half of May, but the latter half has been as fine as the farmer could desire.

CAMPBELL.—Wheat is being harvested—will not make much over half a crop. Rust-proof oats good—other varieties a failure—destroyed with rust. Most farmers over their crop the first time—some cotton squares—laborers scarce—weather fine for farm work. Stock, mules and horses, in good condition.

CLARKE.—The rust-proof oats, whether fall or spring sown, have escaped rust and are yielding well. All other varieties are ruined with rust, so that few of them will be worth cutting.

COLUMBIA.—Many planted large areas in cotton expecting to hire day labor which is scarce. Much of the cotton is not yet chopped out.

COWETA.—Rust-proof oats above an average, but all other varieties, especially spring sown, almost a failure—ruined by rust. The rainfall for May has been unusually heavy, consequently the farmers are delayed with their work. Crops generally foul—day-laborers are scarce and command a dollar per day and board in some parts of the county. Our lands, both upland and bottoms have washed badly. Wheat crop almost a failure, caused by rust and fly.

DEKALB.—One correspondent says: “At the time of my last report, (May 1),

oats never looked finer, but now all varieties that were sown in the spring, except rust-proof, are ruined by rust, so much so that it is my opinion that not more than one acre in ten will be harvested. Had it not been for the rust-proof oats and a few early sown fall oats, the crop would have been a total failure. Wheat generally sown here is purple straw, which is early and hardy, but I think, from two years' experience with Fultz, that it is equally hardy and more productive."

Another says: "Farmers badly behind—cotton rather small, fruit almost an entire failure. A great many cattle have died with murrain (distemper), some farmers having lost all they had. One man lost six in two weeks. Not one in ten got well after taking it. Is there any remedy for them? Wheat is hardly worth cutting in a great many places—some farmers have offered to take the amount of seed they planted for their whole crop. Spring oats are worthless."

DOUGLAS.—Oats sown on cotton at laying by dead—with rust dead. Some fields have produced a full crop of chess-(cheat.) Cotton planted since the April rains, splendid stand and looks fine, that planted before, *little cotton and big grass*. Corn—the stalk is tall enough but too slender. Ravages by budworm extensive.

ELBERT.—"Worms have been very destructive to young corn on lowlands. Can't some one give us a remedy? Rust and fly have injured wheat and oats—not much wheat and oats harvested yet."

FAYETTE.—Repeated overflows and budworms have prevented a stand of corn on bottoms. Rust has destroyed all oats, except the rust-proof and they are affected to some extent. Not more than one-third of the farmers have finished chopping cotton. Wheat harvest over, from ten to fifteen days early—all varieties alike have rusted on red, sandy and mulatto lands. Late sowing decidedly the best—less rust and less injured by insects.

HARRIS.—"Only unadulterated rust-proof oats making any yield; 600 bushels for sale by Cataula Grange that have stood the test.

"Heavy rains May 21st—the heaviest known for years—did much damage to crops and lands, which cannot be estimated.

"Corn has been injured by cut worms; wheat nearly ruined by rust and fly."

HEARD.—"All oats ruined except rust-proof, and many fields of these injured. Labor scarce, and some farmers getting in the grass."

JASPER.—"Rust-proof oats sown in fall are very fine; small white oats sown in spring a total failure from rust.

"Wheat crop injured more by the Hessian fly than by anything else."

LINCOLN.—"Cotton crop ten days to two weeks later; wheat badly damaged by rust; Bill Dallas only partially escaping. All oats, except rust-proof, rusted badly, owing to too much wet weather in March and April."

MCDUFFIE.—"The Dallas, or rust-proof wheat, is the only variety that has paid a profit this year."

MONROE.—"The oat crop of Monroe is one of the finest ever made. Where rust-proof oats were not sown they are nearly ruined by rust; but very few except rust-proof sown.

There is very little rust on the rust-proof variety, and it is thought that where they are affected at all it is supposed to have come from adulterated seed. Wheat was ruined by insects; very little complaint of rust.

"There never was a finer prospect for corn on the first of June. It presents a most healthy and vigorous appearance."

MORGAN.—All oats except rust-proof are ruined with rust. The larger part of our oat crop was sown in the fall, and are of the rust-proof variety. They are fine.

Full blood Merino ewes clipped from seven to nine pounds of wool; half Merino ewes from five to five and a half pounds, while the native sheep only clipped from two to three pounds.

NEWTON.—Rust-proof oats very fine; all others ruined with rust. Farmers are over-cropped, and much grass is the consequence. Hands hard to get, and wages high.

OCONEE.—The red May wheat has suffered less from rust than any other of several varieties sown in this county. Fall sown yellow rust-proof oats have suffered least, and promise a fine yield.

OGLETHORPE.—Spring oats an entire failure—about half the crop of the county was rust-proof, which are good. We have a variety of wheat, which we call rust-proof, which is not injured by rust, though it has it slightly. It is a vigorous and hardy grower, and I think as sure a crop as rust-proof oats.

PIKE.—Early planted cotton very fine—some farmers had to plant over on account of defective seed.

Rust-proof oats fine—all others a failure. Not more than one-fourth of a crop of wheat will be harvested.

PUTNAM.—Rust-proof oats have stood the test again, although some rust was in them. Other varieties almost a failure. Winter Grazing oats, planted by the side of the Yellow Rust Proof at the same time, treated alike in every respect as to land, etc., were not worth gathering. Planters are behind with work and have a good deal of grass in their crops.

ROCKDALE.—Wheat was injured by rust, fly and the last frost. Rust-proof oats are good, other varieties a failure. About 75 per cent. of the crop is rust-proof.

SPALDING.—Rust-proof oats comparatively free from rust and very fine. Other varieties are dead, and many farmers have plowed them up and planted the land in corn and peas.

TALBOT.—Stands of corn very poor on account of cut worms. All kinds of wheat injured by rust more or less, and some was winter killed. No oats have escaped rust except the Red Rust proof variety. This year has proven that pure Rust Proof oats will not rust.

TROUP.—Wheat was injured by both fly and rust. Oat crop a failure except the rust-proof—they are very fine. Peaches nearly a failure. Apples some better. Pear crop very light, some blight appearing on the trees.

Corn on upland badly thinned by cut worms—otherwise better than last year. Bottoms not in good condition yet.

Cotton in size is fully up to an average, but in some localities is dying fearfully, and much of the crop remains to be chopped. There are very few sheep in Troup county, and these are found in small flocks. Rice does remarkably well, but there being no mills for cleaning it, very little attention is given this crop. Can you not encourage some person to erect a mill in this county?

WALTON.—Oats a total failure except the rust-proof variety—a good crop of them sowed and fine yield. Wheat badly injured by fly and rust. Corn and cot-

ton look well, though there is some grass in the latter, but both farmers and laborers are working well.

WARREN.—Good stands of cotton and corn. Gardens forward and good. Crops generally in good condition. Wheat, except the Dallas variety, badly rusted. Rust-proof oats, sown in the fall, good. Black oats, sown at the same time, ruined.

WILKES.—Wheat crop a failure, except two varieties of rust-proof. Oats ruined by rust, except the rust-proof variety, and in some places they have not entirely escaped.

SOUTHWEST GEORGIA.

BAKER.—The oat crop has fallen below the expectation entertained at last report. We shall have to import seed oats here, from more favored sections.

BROOKS.—Oat crop a failure; cotton looking unusually well and stand good. Corn not as good as last year, stalk small and pinched. All other crops, looking well. Hogs doing well.

CLAY.—Corn, cotton, sugar cane and ground peas were never so prosperous as now. Our farmers are greatly encouraged; they smile all the time (over their prospect) and many even fall asleep with smiles on their faces. God grant that their anticipations may be fully realized.

DOOLY.—The red rust-proof oats have given satisfaction. The Irwin oats have generally rusted, while the red rust-proof have escaped. Plenty of rain through April and May; plenty of grass; cotton chopping not over. The outlook for a good corn and cotton crop, is very promising.

LEE.—The incessant rains during May have caused the farmers to be behind in chopping cotton, and a good deal of grass in consequence, and will somewhat injure stand in cleaning it.

LOWNDES.—May season fine for corn, rice, chufas, potatoes, cane, oats. Too much rain for melons, and renders it difficult to destroy grass in cotton. Red Rust Proof oats exempt from rust. Some fields of horned oats exempt. Others rusted. Rust here is manifestly largely attributable to condition of seed. When different parcels of seed of similar variety have been sown in same field, and as nearly at the same time as possible, the whole of one parcel has rusted, while the other has entirely escaped.

MARION.—Oats will deteriorate planted continuously on the same soil. Mine, planted twenty years on the same farm, had no cockle or cheat at first, but became so infected with both that last year I had to obtain new seed, which were called Texas Rust Proof. They have proved rust proof, grew taller and made the best crop I have made in twenty years.

MILLER.—The corn crop is fine. The stand was injured by a small worm that bored into the stalk just above the root. The crops, where properly worked, are exceedingly fine.

QUITMAN.—All oats, except rust-proof, are a total failure; while rust-proof has not been troubled by rust, and is full up to last year's crop, and will aid farmers greatly in making their crops.

STEWART.—The Bancroft is the only oats that escaped the rust. Little red wheat with purple straw had less rust than any other.

SUMTER.—All fertilized oats escaped rust, some few of us have a purple or red straw oats that has made a fine crop.

EAST GEORGIA.

MONTGOMERY.—Apple trees are doing strangely. Some are just beginning to bloom, others are laden with a full crop of apples about half grown, and are almost perfectly white with blooms. Will the tree with half grown apples and blooms mature both crops?

WILKINSON.—The oldest inhabitants say that the rains have been heavier than they have been in the last twenty years. Lands never worse washed. Grass growing luxuriantly. Impossible to get hands at reasonable prices. Some farmers pay seventy-five cents and one dollar per day for hands, with rations, for cotton hoeing.

Mexican Rust Proof oats has escaped rust in this county this year and for several years before. All other varieties (the Irwin County Rust Proof) have rusted more or less. Wheat rusted. The Tappahannoc and Red May the favorite here.

SOUTHEAST GEORGIA.

PIERCE.—Crops taken all in all are the finest I have ever seen in the county, and all of one month earlier than in former years. Corn in full silk and tassel, and forward planting is in mutton condition. A good season now will make it. I have seen no cotton blossoms, but there will be plenty of them in a few days. The fruit, comparatively speaking, will be a failure—not more than one-fourth of crop.

TABLE.—*Showing the comparative condition of Corn, and Cotton, the yield of Oats and Wheat, etc.*

NORTH GEORGIA.

COUNTIES	Corn.		Oats.		Wheat.		Cotton.		COUNTIES	Corn.		Oats.		Wheat.		Cotton.	
	Condition, compared to average.	Condition, compared to this time last year.	Yield, compared to an average.	Extent of injury from rust.	Yield, compared to an average.	Extent of injury from rust.	Stand, compared to an average.	Condition, compared to an average.		Condition, compared to average.	Condition, compared to this time last year.	Yield, compared to an average.	Extent of injury from rust.	Yield, compared to an average.	Extent of injury from rust.	Stand, compared to an average.	Condition, compared to an average.
Banks.....	90	92	80	20	70	30	101	100	Haralson	100	97	75	25	70	80	105	105
Bartow.....	100	90	50	50	60	40	125	90	Hart.....	95	97	65	35	65	80	100	97
Catoosa.....	75	99	25	75	50	25	100	100	Jackson.....	97	95	40	55	37	60	100	95
Chattooga...	100	100	25	75	25	75	100	100	Lumpkin....	105	100	60	40	45	50	100	107
Cherokee....	103	112	18	80	55	40	103	85	Madison....	100	95	70	30	60	40	105	95
Cobb.....	.....	.....	.....	.....	.....	.....	.....	.....	Milton.....	100	105	60	25	70	20	100	90
Dade.....	80	85	.....	10	50	20	105	100	Murray.....	100	100	100	.....	.....	.....	.....	.....
Dawson.....	.....	.....	.....	.....	.....	.....	.....	.....	Paulding....	75	50	125	.....	50	50	110	97
Fannin.....	92	95	50	50	85	55	100	100	Pickens.....	100	101	62	30	40	55	105	105
Floyd.....	80	80	60	70	70	80	100	105	Polk.....	.....	.....	.....	.....	.....	.....	.....	.....
Forsyth.....	90	85	60	40	50	40	100	100	Rabun.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin....	.....	.....	.....	.....	.....	.....	.....	.....	Towns.....	.....	.....	.....	.....	.....	.....	.....	.....
Gilmer.....	93	100	50	40	40	60	103	100	Union.....	105	97	55	50	35	65	98	97
Gordon.....	95	95	50	50	50	50	100	80	Walker.....	75	50	125	.....	50	50	110	100
Gwinnett...	85	90	60	40	60	50	100	95	White.....	100	101	62	30	40	55	105	105
Habersham...	100	85	63	37	70	30	90	90	Whitfield...	.....	.....	.....	.....	.....	.....	.....	.....
Hall.....	.....	.....	.....	.....	.....	.....	.....	.....	Average.....	95	94	54	41	51	42	102	97

MIDDLE GEORGIA.

Baldwin.....	93	107	70	30	50	45	100	90	Lincoln.....	97	100	93	90	60	26	100	92
Bibb.....	100	105	97	80	.....	100	90	McDuffie.....	94	103	.....	.....	55	33	103	105
Butts.....	95	97	50	50	50	95	83	Meriwether.....	100	100	75	25	40	100	90	.....
Campbell...	96	96	50	50	50	93	99	Monroe.....	107	110	110	5	60	40	102	90	
Carroll.....	100	100	60	30	75	15	105	Morgan.....	100	100	90	10	36	63	87	90	
Clarke.....	105	103	80	20	75	20	100	Newton.....	95	95	80	20	70	30	100	90	
Clayton.....	100	90	90	10	80	10	100	Oconee.....	98	100	85	15	70	30	105	90	
Columbia...	80	78	90	10	65	30	95	Oglethorpe	112	100	50	50	55	45	105	98	
Coweta.....	85	90	70	25	40	55	95	Pike.....	100	102	70	30	25	75	105	95	
DeKalb.....	85	77	40	60	45	50	98	Putnam.....	100	110	105	7	55	45	105	105	
Douglass...	85	80	65	25	50	40	100	Rockdale...	105	110	72	25	50	40	100	100	
Elbert.....	95	100	75	25	50	35	105	Spalding...	106	105	45	50	50	50	100	80	
Fayette.....	90	85	30	65	40	60	95	Talbot.....	90	95	90	10	45	50	100	97	
Fulton.....	100	100	75	25	50	50	100	Taliaferro...	97	100	85	15	45	55	110	100	
Greene.....	105	115	90	10	50	30	105	Troup.....	90	95	55	40	50	40	102	90	
Hancock...	105	107	90	10	50	50	95	Upson.....	95	95	90	10	60	30	90	80	
Harris.....	90	97	65	30	45	50	85	Walton.....	101	105	70	25	70	30	105	102	
Heard.....	80	75	50	50	50	45	90	Warren.....	105	100	80	20	60	30	105	100	
Henry.....	95	97	45	50	60	35	108	Wilkes.....	100	105	80	.....	60	.....	100	100
Jasper.....	100	115	100	.....	70	30	100	110								
Jones.....	100	107	75	25	35	60	92	100	Average...	95	101	74	28	54	40	99	98

TABLE I—Continued.

SOUTHWEST GEORGIA.															
COUNTIES	Corn.		Oats.		Wheat.		Cotton.		COUNTIES	Corn.		Oats.		Wheat.	
	Condition compared to average.	Condition compared to this time last year.	Yield compared to an average.	Extent of injury from rust.	Yield compared to an average.	Extent of injury from rust.	Stand compared to an average.	Condition compared to an average.		Condition compared to average.	Condition compared to this time last year.	Yield compared to an average.	Extent of injury from rust.	Yield compared to an average.	Extent of injury from rust.
Baker.....	100	112	40	60	25	75	110	115	Macon.....	94	95	60	40	40	60
Berrien.....	112	110	60	40	.....	.....	115	103	Marion.....	100	105	90	20	50	50
Brooks.....	98	100	55	40	.....	.....	100	105	Miller.....	90	98	60	40	.....	108
Calhoun.....	.....	.....	.....	.....	.....	.....	.....	.....	Mitchell.....	100	105	60	25	75	50
Chat'h'chee.....	85	85	85	.....	90	15	80	75	Muscogee.....	.....	.....	.....	.....	.....	.....
Cly.....	100	125	60	40	60	40	100	108	Quitman.....	90	100	80	20	15	85
Colquitt.....	110	110	50	50	.....	.....	100	100	Randolph.....	106	107	60	40	35	65
Crawford.....	.....	.....	.....	.....	.....	.....	.....	.....	Schley.....	100	110	82	18	40	60
Decatur.....	.....	.....	.....	.....	.....	.....	.....	.....	Stewart.....	100	105	87	12	37	60
Dooly.....	100	105	60	40	45	50	105	106	Sumter.....	97	97	60	40	37	60
Dougherty.....	100	100	35	65	35	65	90	95	Taylor.....	90	100	100	10	50	25
Early.....	95	116	45	50	30	60	97	95	Terrell.....	105	107	42	62	27	72
Houston.....	110	100	90	10	40	60	110	110	Thomas.....	115	126	50	50	.....	90
Irwin.....	115	101	50	50	.....	.....	110	100	Webster.....	100	125	65	35	85	62
Lee.....	100	105	50	50	40	60	105	90	Wilcox.....	100	110	75	25	90	10
Lowndes.....	112	112	50	50	10	90	87	87	Worth.....	100	110	89	20	50	50
Average.....										104	106	63	37	43	55
EAST GEORGIA.															
Bulloch.....	110	112	82	20	.....	.....	100	107	Pulaski.....	120	125	85	20	75	25
Burke.....	100	110	50	50	75	25	100	100	Richmond.....	110	115	95	.....	90	110
Dodge.....	100	110	80	20	75	25	100	100	Screven.....	97	99	85	20	.....	94
Emanuel.....	100	100	80	20	75	25	100	100	Tatnall.....	.....	.....	.....	.....	.....	.....
Glascock.....	100	105	87	25	50	50	85	100	Telfair.....	107	110	45	55	.....	102
Jefferson.....	98	99	78	22	54	46	93	90	Twiggs.....	98	99	65	35	62	35
Johnson.....	105	105	72	27	90	22	100	90	Washington.....	96	90	85	25	20	75
Laurens.....	110	100	75	25	.....	.....	125	133	Wilkinson.....	100	105	75	30	45	55
M'tg'mery.....	105	110	72	25	.....	.....	100	100	Average.....						
										104	105	75	29	64	40
SOUTHEAST GEORGIA.															
Appling.....	106	100	75	25	.....	.....	100	100	Effingham.....	100	105	67	32	.....	110
Bryan.....	.....	.....	.....	.....	.....	.....	.....	.....	Glynn.....	100	110	50	50	.....	90
Camden.....	110	100	90	10	.....	.....	100	95	Liberty.....	102	105	50	50	.....	105
Charlton.....	100	.....	15	85	.....	.....	80	70	McIntosh.....	90	90	50	50	.....	90
Chatham.....	.....	.....	.....	.....	.....	.....	.....	.....	Pierce.....	125	150	75	25	.....	100
Clinch.....	102	103	75	25	.....	.....	100	104	Ware.....	.....	.....	.....	.....	.....	.....
Coffee.....	102	107	67	50	.....	.....	102	100	Wayne.....	.....	.....	.....	.....	.....	.....
Echols.....	.....	.....	.....	.....	.....	.....	.....	.....	Average.....						
										103	108	61	40	.....	98
RECAPITULATION.															
NORTH GEORGIA.....	95	94	54	41	51	42	102	97							
MIDDLE GEORGIA.....	95	101	74	28	54	40	99	93							
SOUTHWEST GEORGIA.....	104	106	63	37	43	55	100	98							
EAST GEORGIA.....	104	105	75	29	64	40	101	100							
SOUTHEAST GEORGIA.....	103	103	61	40	.....	.....	98	99							
General Average.....										98	101	68	34	52	44

SUMMARY OF WEATHER REPORTS FOR MAY, 1880.

NORTH GEORGIA.

STATIONS.	Temperature.				Days on which rain fell.
	Max.	Min.	Mean	Total Rainfall.	
Canton	86.0	50.0	71.4	3.80	2, 3, 21, 24, 30.
Ellerslie	88.0	55.0	67.0	5.10	5, 10, 21, 24, 28, 29, 31.
Gainesville	83.0	44.0	69.9	3.70	3, 4, 5, 13, 21, 22, 23, 28, 29, 30.
Leo (White county)	86.0	43.0	72.4	5.47	3, 4, 5, 11, 14, 21, 22, 23, 24, 27, 29, 30.
Mt. Airy	87.0	49.0	70.8	5.44	2, 3, 11, 12, 21, 22, 23, 24, 29, 30.
Rabun Gap	89.0	45.0	67.2	3.90	3, 21, 22, 23, 24, 30.
Rome	86.0	44.0	72.5	3.00	4, 21, 29, 30.
Toccoa	93.0	48.0	73.6	3.02	21, 22, 23, 29, 30.
Means	86.5	46.7	69.9	5.43	

MIDDLE GEORGIA.

Athens	86.0	46.0	75.5	4.32	2, 3, 4, 10, 21, 22, 23, 29, 30.
Atlanta	89.0	44.0	71.3	4.26	3, 4, 9, 21, 22, 29, 30.
Carrollton .....	.....	.....	.....	.....	.....
LaGrange	87.0	58.0	73.0	4.70	2, 3, 4, 10, 21, 30.
Macon	89.0	56.0	72.0	3.22	2, 3, 10, 22, 23.
Oxford	88.0	46.0	71.7	3.05	1, 9, 21, 23, 30.
Thomson	88.0	53.0	74.0	1.45	3, 12, 21, 22, 30.
Woodbury .....	.....	.....	.....	.....	.....
Means	87.8	50.5	72.9	3.50	

SOUTHWEST GEORGIA.

Americus	86.0	62.0	75.4	3.75	2, 3, 4, 5, 9, 10, 12, 22, 23.
Cuthbert .....	.....	.....	.....	.....	.....
Nashville	92.0	60.0	76.0	3.20	3, 9, 10, 12, 13, 23, 24, 25.
Thomasville	87.0	55.0	74.3	10.81	3, 4, 8, 9, 10, 11, 13, 22, 23, 24, 30.
Means	88.3	59.0	75.2	5.92	

EAST GEORGIA.

Augusta	84.0	52.0	72.5	3.17	3, 4, 12, 21, 22, 23, 30.
McRae	98.0	60.0	79.2	3.60	4, 11, 22.
Ogeechee	88.0	57.0	75.5	1.70	4, 22.
Swainsboro	95.0	57.0	74.8	1.70	2, 3, 13, 21.
Means	91.2	56.5	75.5	2.54	

SOUTHEAST GEORGIA.

Blackshear	92.0	64.0	78.9	3.66	4, 14, 21, 23.
Brunswick	89.0	62.0	74.0	6.93	2, 3, 4, 5, 9, 10, 11, 12, 21, 22, 25, 26.
St. Mary's	88.0	64.0	73.4	8.40	1, 3, 4, 5, 9, 10, 12, 13, 21, 22, 25.
Walthourville .....	.....	.....	.....	.....	.....
Means	89.7	63.3	75.4	6.33	
Means for State	88.4	53.4	73.2	4.57	

SEED WHEAT AND OATS.

N. B.—Those farmers who have seed for sale of wheat and oats that have escaped rust this season, will find it to their interest to communicate to this Department the facts in each case, giving name of variety, time of sowing and reaping, yield per acre, and the extent of injury by rust, together with a statement of number of bushels for sale, price, and post-office address. Strictly rust-proof oats will be in great demand next season. Even now inquiries are frequently received in regard to the best varieties. Oats that have escaped the rust the past season may be regarded as absolutely rust-proof; and the opportunity thus afforded by the “survival of the fittest,” to determine upon the *very best* seed, and to widely disseminate them, ought to be seized upon and improved.

Such farmers are, therefore, requested to give the information desired, and at the same time send samples of such seed, both in the sheaf and clean, that they may be placed on exhibition in this office, and for the purpose of comparing different specimens of varieties called by the same or different names, with a view to perfecting and harmonizing our nomenclature.

The information thus furnished will at all times be gladly communicated to all inquirers.

Special Circular No. 7. }
NEW SERIES. }

REPORT OF GROWING CROPS, ETC., FOR THE MONTH
OF JUNE 1880.

RETURNABLE JULY 1st, 1880.

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA., June 9, 1880.

DEAR SIR—Please answer the following questions **on the 1st day of July**, or a few days before, if necessary, and mail promptly, so that your report may reach this office **by the Third of July**.

Answer every question, that will permit of it, in numbers indicating per cent.

An AVERAGE CROP, or AVERAGE CONDITION, or anything with which comparison is made, is always taken as 100. Thus, if the corn crop at any time is 10 per cent. better than last year, or 10 per cent better than an average, it should be reported as 110 in each case; and if ten per cent. below these standards, it should be 90. Never report "10 per cent. better" or "10 per cent. worse," but 110 or 90, as the case may be. So avoid vague comparisons, such as, "some better," "hardly so good," "above an average," etc.

In making up your answers, let them apply to the whole county in which you reside, or as far in every direction as your knowledge may extend, *not simply to your own farm.*

If a crop about which questions are asked is not grown in your county, use the character **X**. If you have not sufficient data to make an approximate estimate, leave the space blank.

Very Respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

I. For what county do you report?.....county.

II. Your name?

III. Your post-office?.....

CORN.

1. Condition and prospect compared to an average?.....per cent.

COTTON.

2. Condition and prospect compared to an average? .. .per cent.
3. Date of first bloom in your regular field crop?.....date.

OATS.

4. Total product of fall and spring sown, compared to last year?.....per cent.
5. Average yield, per acre, *this year*, of rust-proof, *fall sown*?.....bushels.
6. Average yield, per acre, *this year*, of rust-proof, *spring sown*?.....bushels.
7. Average yield, per acre, *this year*, of other varieties, *fall sown*?.....bushels.
8. Average yield, per acre, *this year*, of other varieties, *spring sown*?.....bushels.
9. Total product, in your county, compared to last year?.....per cent.
10. Average yield, per acre?.....bushels.

MISCELLANEOUS.

Condition and prospect, compared to an average of--

- 11.¹ Rice?.....per cent.
12. Sugar cane?.....per cent.
13. Sorghum?.....per cent.
14. Sweet potatoes?.....per cent.
15. What varieties of corn are principally planted in your county?.....
.....
.....
16. What varieties of cotton are principally planted in your county?.....
.....
.....

REQUEST.—If you, or any of your neighbors, have a variety of wheat that has proved to be practically rust-proof this year, please procure and send to this Department a small bundle of the same, and also about one pint of the clean seed. If any, state quantity for sale and price, and name of variety.

Persons who have seed for sale, of oats that have entirely escaped rust this season, are also requested to notify this department, stating *name* of variety, number of bushels, price, etc.

NOTES.—Report any facts of general interest to the farmers of the State; remarkable or exceptional yields of oats or wheat, with methods of culture, varieties sown, etc.

.....

County.

.....

Reporter.

Circular No. 8. }
NEW SERIES. }

Consolidation of the Reports of Crops, Etc.,

FOR THE MONTH OF JUNE, 1880.

RETURNED TO THE DEPARTMENT OF AGRICULTURE JULY 1, 1880.

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA., July 10, 1880.

CORN

Has been injured in some sections by drouth on uplands but it is believed that the recent rains have come in time to save the crop in Middle and North Georgia. It is feared that in some counties in East Georgia the crop was too far advanced to entirely recover from the effects of the drouth. Insects of all kinds have been unusually destructive this year, having commenced propagating earlier than usual. The condition of corn in the entire state compared to an average is 87.5. At the same time last year it was 83.5. In 1878, 107.

Its condition in the different sections of the state compared to an average is, in North Georgia 96, Middle Georgia 84, Southwest Georgia 88, East Georgia 79, and in Southeast Georgia 92. The comparative failure in the oat crop this year increases the interest in the corn crop. Fortunately, however, our seasons are so long that auxiliary crops may be planted to supplement both corn and oats. For this purpose field peas may yet be planted for forage, and German and Hungarian millet sown now on rich land will have ample time to mature, and if sown thick and harvested *as hay* while in bloom, make good winter forage. A large quantity of native grass may be converted into hay on most farms, the principal difficulty in making hay of them arising from the fact that they must be harvested in August and September, when the dews are very heavy and the weather warm. Bottom land corn has not been injured by drouth, but in many instances great difficulty has been experienced in securing a stand on account of the ravages of the bud-worm.

COTTON,

though retarded in its growth by drouth, is not thought to be materially injured. On the contrary, planters have availed themselves of the dry weather to put their crops in good condition. Enough rain during the month of June to make a full corn crop would probably have caused the abandonment of a large area of cotton, many having been disappointed in securing day laborers, on whom they relied for much of the work in their crops. There is an unusual complaint of scarcity

of labor. The cotton prospect compared to an average in the whole State is 3.4 better than at the same date last year, though far below that of 1878.

This year it is 96; in 1879 it was 92.6; in 1878, 105. The production will depend upon the seasons during July and August, the critical months for this crop.

By sections, the average condition is: in North Georgia, in which the area devoted to this crop increases annually, 102; in Middle Georgia, 88; in Southwest Georgia, 100; in East Georgia, 95, and in Southeast Georgia, 101.

OATS

have been threshed in a large portion of the State, and the test of the half bushel fully sustains the reports of last month as regards the rust-proof varieties, a few only reporting disappointment in the anticipated yield. Notwithstanding the rust, if the rust-proof varieties had been universally sown, as they should have been, the crop of the State would have been almost a full one. As it is, only 62 per cent. of last year's crop has been harvested.

In North Georgia, the total yield compared to that of last year is 47; in Middle Georgia, 72; in Southwest Georgia, 60; in East Georgia, 66, and in Southeast Georgia, 54. In Middle and North Georgia, the rust-proof varieties entirely escaped rust. In the extreme southern part of the State they did not.

The average yield per acre of the rust-proof varieties, this year, fall sown, is 16 bushels per acre; spring sown, 12.6. Other varieties, fall sown, 4.3; spring sown, 2.7. The yield in the State, all varieties, notwithstanding the loss by rust, is 10.6, showing that the larger part of the crop was of the rust-proof varieties. It is hoped and believed that none who can procure seed of the rust-proof will sow any other kind this year.

For further information on this subject, attention is invited to Notes from Correspondents in this circular.

RICE

In the section of the State specially devoted to its cultivation, Southeast Georgia, is reported 102, or two per cent. above an average. The cultivation of upland rice is regularly increasing. A correspondent from Habersham county says it can be successfully cultivated on any land that will make good corn. Its cultivation affords an inviting field for increased diversity of production in the interior of the State.

SUGAR CANE

Is reported for the State at 92, but in the two sections in which it is principally grown, Southwest and Southeast Georgia, it is 95 and 98 respectively. The introduction of the improved shallow evaporators has greatly facilitated the conversion of the cane juice into syrup and sugar, and it is hoped will materially increase the production of this important crop in the southern portion of the State where soil and climate favor its cultivation.

SORGHUM

Is receiving less attention than formerly. Two causes have contributed to this result, viz: the generally prevalent impression that it is an exhausting crop, and the fact that it demands attention while cotton planters are busily engaged picking cotton. None is reported in Southwest Georgia. Its condition in North

Georgia is 91; in Middle Georgia, 89; in East Georgia, 74; and in Southeast Georgia, 100.

SWEET POTATOES

are reported 100 in North Georgia; 95 in Middle Georgia; 96 in Southwest Georgia; 87 in East Georgia, and 100 in Southeast Georgia. This crop does not receive the attention as food for stock that its importance justifies. Our soil and climate are peculiarly adapted to its production, while the season for growing turnips is generally too dry for their successful production and they are subject to depredation by various insects; but the sweet potato is entirely exempt from injury from this source. Again the potato has better keeping qualities, and is about nine times as nutritious as turnips. Mr. Munro, of Marion county fattens his pork almost entirely on potatoes. For this purpose the vines are better than slips for planting and may be planted later in the season.

WHEAT

as a crop has been a failure in the State, except with a few hardy varieties, notably the Dallas, Mediterranean and Red Purple Straw. The impression is very prevalent that Northern wheats are better for seed than those that have been planted for many years in Georgia, while experience teaches just the reverse. The most successful varieties are those that have been sown in Georgia for many years, and the most successful growers are those who have sown the same wheat produced on their own farms for a quarter of a century. See notes from correspondents on this subject.

GENERAL OUTLOOK.

While the crop prospect in the State is not flattering, it is not discouraging, and with favorable seasons from this date a full crop of the great staples, cotton, corn, rice and cane may be harvested. The multitude of letters received at this office making inquiry for the better varieties of wheat and oats are encouraging, since they manifest a determination on the part of the farmers of the State to profit by the experience of the last small grain crop, the disaster in which will probably prove advantageous in directing attention to a most important matter which has hitherto been too much neglected—that of a judicious choice and careful selection of seed. Farmers need to follow the example of horticulturists who have devoted themselves to the improvement of old and the development of new varieties with results hardly less than wonderful. Fifteen years ago, the earliest peach ripened about the 24th of June. Now a number of varieties ripen by the 24th of May. The tomato, formerly no larger than a plum has been improved until now, single specimens often weigh more than a pound. Farmers need to devote more attention to the improvement of agricultural seeds. The inquiry as to the varieties of corn planted develop the fact that with rare exceptions we have in Georgia no distinct varieties but generally a mixture of various kinds and colors. The nomenclature in cotton is more distinct but there is room for improvement in this also. Agricultural Societies, State and local, are urged to take this matter under consideration.

IMPORTANT CONVENTIONS.

The Georgia State Agricultural Society, which has done so much to advance the productive interests of the State, will hold its next semi-annual convention at Hartwell, Hart county, commencing on the 10th of August.

These conventions are both interesting and instructive and farmers in every section of the State, whether delegates or not, will find it profitable to attend. It is matter of regret that the programme is not at hand for incorporation in this circular.

Attention is invited to the following circular of the Georgia State Horticultural Society:

GEORGIA STATE HORTICULTURAL SOCIETY—FIFTH ANNUAL SESSION.

The fifth annual session and exhibition of fruits, vegetables and plants will be held in the city of Atlanta on the 3d and 4th of August, 1880, commencing at 10 o'clock a. m.

The past annual meetings have been numerously attended, and the exhibitions of fruits and vegetables practically demonstrated the vast resources of Georgia as a producing State. The impetus given to fruit culture and horticultural tastes, through the influence of the labors of this Association, are visible throughout the whole commonwealth. The forthcoming session, it is confidently expected, will be one of the most interesting and useful ever held by the Society.

All horticulturalists, fruit growers, progressive agriculturalists, and especially the ladies of Georgia, are earnestly and cordially invited to attend personally, and bring such articles for exhibition as will make the display of Georgia-grown fruit, flowers and vegetables creditable to the skill and cultivation of its people.

It is earnestly hoped that there will be a full attendance of members from every section of the State, that concentrated information and experience of fruit growers may be obtained, thus aiding the Society to perfect its several catalogues of fruits and vegetables adapted to each geographical division of the State. These catalogues are now the recognized reliable guides of the fruit growers of Georgia, and have had a most wonderful influence in developing its fruit growing interest.

The Southern Express Company, with its usual liberality and interest evinced in the success of the Society, will carry free of charge all packages of fruits, flowers and vegetables intended for the exhibition. Packages should be addressed as follows: B. J. Wilson, Atlanta, Ga., for State Horticultural Society, and the name of sender plainly marked on the package. All articles for the exhibition should be sent to reach the hall on Monday evening, August 2d, or by Tuesday morning at latest. A full list of varieties should also be sent with the articles contributed, that a full report may be made by the Society.

The several railroads of the State have also generously offered to carry members and delegates at reduced rates. The Central, Atlanta and West Point, Southwestern, Macon and Brunswick Railroads will return members free over their several lines on presentation to conductors of certificates signed by the presiding officer of the Convention showing that the holder was a delegate, had been in attendance on said Convention, and paid full fare going.

The Western and Atlantic Railroad will sell to the members of the Society, at their local depots, half-rate tickets, on which they can attend the Convention and return for half the usual fare.

The Atlanta and Charlotte Air-Line Railroad return members at one cent per mile on the certificate of the Secretary that they attended the meeting. They pay full fare going.

The Georgia Railroad will sell round trip tickets at any ticket station on line of road and branches at three cents per mile each way. Tickets good for ten days from date of issue.

Annual membership, \$2. New members will be supplied with back numbers of the proceedings of the Society as far as possible.

P. J. BERCKMANS, *President*, Augusta, Ga.

T. L. KINSEY, *Secretary*, Savannah, Ga.

The horticultural interests of Georgia are rapidly growing in importance. Georgia peaches, pears and melons have a national reputation, and contribute no small amount to the income of our people.

This Convention will be largely composed of the most skilled and experienced fruit growers of the State, and the exhibition will illustrate the fruit production of Georgia.

It will be seen by reference to the circular, that the Express Company transport fruit, vegetables and flowers, for exhibition by this Society, *free of charge*. Those having fruit which they desire named, or which they wish to bring into notice, will do well to exhibit it at this fair. Those having seedling fruits of special merit are especially requested to send specimens, since it is upon Southern seedlings, especially of apples, that we must rely mainly for our successful varieties. One can learn more about the varieties of fruit in two days at one of these Conventions and exhibitions of the State Horticultural Society, than in two weeks under almost any other circumstances.

Very respectfully,

J. T. HENDERSON,

Commissioner of Agriculture.

NOTES FROM CORRESPONDENTS.

NORTH GEORGIA.

CHEROKEE.—Bad stands of corn on late planted bottoms on account of bud worms. Experience for fifteen years is in favor of planting bottoms early to escape bud worms.

COBB.—Some crops of cotton have suffered for work where day labor was depended upon. Day hands are paid from 75 cents to \$1.00 per day. Some patches of rust-proof oats will thresh out 50 to 60 bushels per acre.

DADE.—Fall sown oats were winter killed. All spring sown, except rust-proof, killed by rust. J. C. Nisbet, at Cloverdale, has about 400 bushels very fine rust-proof oats for sale. Mr. W. A. Chambers, of Morgansville, has 100 or 200 bushels for sale.

GWINNETT.—Cotton crop well worked and very fine. H. D. Lowe, at Lawrenceville, has rust-proof oats for sale. S. H. Check, of Suwanee, has them for sale also. J. R. Hopkins, of Norcross, and some of his neighbors, have rust-proof oats for sale.

HABERSHAM.—Every variety of wheat rusted. Dr. James P. Phillips says: "For over twenty years I have sown a variety of oats, nameless; have sold seed oats every season. This season will thresh from 45 to 50 bushels per acre, field crop, without any manure. . . . I sow in August and September." Stand of corn poor, but the crop has been much improved by recent dry weather.

HART.—Crops in fine condition; general rain June 29th. Those who sowed Dallas wheat made good crops, though it rusted some. It was much better this year than any other variety. Red rust-proof oats sown in the fall on low ground made fine oats, and had no rust.

MADISON.—No wheat escaped rust. No oats escaped rust except the rust-proof.

MILTON.—Oats and wheat all injured by rust; bearded wheat has done best this year. Blight of apple twigs general.

TOWNS.—Bottom land corn badly injured by bud worm. Oats and wheat badly injured by rust. Peaches, none; apple and grape crop very good.

WALKER.—All wheat rust; very few rust-proof oats sown. Prospect good for corn and cotton.

WHITFIELD.—Other crops have been neglected for cotton, which looks well. Small grain almost a failure.

MIDDLE GEORGIA.

BALDWIN.—Corn seriously injured by drouth. Cotton small, but looking healthy. G. T. Whilden made 121½ bushels of rust-proof oats on one acre. He weighed 100 pounds in sheaf and it threshed 1½ bushels. He has 100 bushels for sale.

BIBB.—Drouth for 27 days has injured corn, and highly fertilized cotton is beginning to fire and shed both forms and bottom leaves.

BUTTS.—Crops have suffered for rain—plenty now. Cotton late and small. Planters up with their work.

CAMPBELL.—Southern part of the county suffered for rain. Oats sown in January, the time preferred in this county, 50 per cent. better than those sown later.

Some of the cotton crops abandoned to grass and weeds on account of laborers leaving the farm.

F. H. Steed, Palmetto, has a few bushels of Bret oats for sale; said to be ten days earlier than the red rust-proof.

COLUMBIA.—Crops suffering for rain to 24th June. Dallas wheat has escaped rust where pure seed were sown. Cotton clean and looking healthy.

COWETA.—Col. W. S. Bailey, near Turin P. O., has the only crop of wheat in the county that entirely escaped rust. It was drilled on ordinary gray land, and the yield 10 bushels per acre. A very remarkable yield when other crops ranged from 3 pecks to 3 bushels per acre. J. H. Wynn, A. W. Hill and others made fine crops of rust-proof oats. Will send samples of wheat and oats. Cotton plant small, but fruiting well.

DEKALB.—M. A. Steele, Decatur, Rawley Shipley, Doraville, and John Kilgore, Stone Mountain, have rust-proof oats for sale.

ELBERT.—All varieties of wheat rusted and all except strictly rust-proof oats. Mr. F. P. Thornton, Cold Water, has a variety known as the North Carolina oat, which has so far escaped rust and proven very productive. He has 75 bushels for sale.

GREENE.—Every variety of wheat rusted in this county. Rust-proof oats escaped.

C. M. Sanders, Penfield, has several hundred bushels for sale. Crops have suffered from drouth.

HANCOCK.—Crops have suffered from drouth. Plenty of rust-proof oats for sale in the county.

HEARD.—Seasons have been good in half the county—the other half has suffered for rain. Corn small on upland, and bad stand on bottom. Crops well worked and clean.

HENRY.—Rust-proof oats the only reliable variety. Those sown in January far excelled the fall oats this year.

LINCOLN.—Mr. J. M. Dill, Clay Hill, writes: "The weather is extremely dry no rain of consequence in six weeks, upland corn bids fair at this writing to be almost an entire failure in consequence of drouth and the depredations of a small brown worm that bores into the first joint at the ground and consumes the heart stalk of the up to the tassel, numbers of stalks fall down and the fodder on the balance hangs down around the stalk. The momentous question with every one is, what is the remedy? Can the Department indicate one?"

Mr. T. H. Remæn, Goshen, writes: "The Dallas wheat on both uplands and bottoms, where sown late has escaped rust. A neighbor of mine, on bottom land, made eighteen bushels of the above wheat per acre, after having been overflowed by high water in March. It had no rust. He will have one hundred and fifty bushels for sale. The Dallas wheat is the only one that has yielded anything in

my neighborhood. All others almost entirely ruined by rust. The fly proved the only enemy of the Dallas wheat. The red rust-proof oats escaped rust altogether as far as my knowledge extends."

Mr. N. A. Crawford says: "There is very little wheat of any variety sown in this county but the Dallas. Other varieties have often been tried, but in the end prove failures. The Dallas wheat originated in this county. It was introduced here from Edgefield county, S. C., by William Sims and William Dallas, prominent farmers. The latter took a great deal of pains in improving it and hence it took his name. Since his death, ten years ago, D. B. Cade, whose post office is Danburg, Wilkes county, has taken even more pains than Mr. Dallas. Mr. N. W. Stevenson, whose post office is Goshen, has more and better quality of this wheat to sell than any man I know in this county. The Dallas is evidently a mixed wheat—makes over an average quality of flour and can be made to produce twenty-five or thirty bushels per acre. This wheat was known as the Williams wheat when introduced here."

McDUFFIE.—Mr. A. E. Sturgis says: "All oats except the rust-proof prove a complete failure this year. You will see from my weather report that I have no rain to report—none has fallen in six weeks. This is the first month in twenty-eight years during which it failed to rain enough to record. Corn will be a complete failure unless we have rain in a few days. Some portions of the county have had partial showers."

MERIWETHER.—No wheat escaped rust. Red rust proof oats entirely free from rust. Mr. Peter M. Martin has 2,000 bushels for sale. Some portions of the county very dry. Corn suffering.

MONROE.—Mr. Thomas G. Scott, says: 'Persons who did not sow the rust proof oats failed in almost every instance, I don't remember, indeed, to have heard of a single case where other varieties than rust proof were sown that they were cut. There are cases of farms adjoining each other where good crops of rust proof oats were made while the other kinds were not even worth cutting. I have about 300 bushels of yellow rust proof oats for market. * * Mr. H. J. Howard, a near neighbor, 300 or 400 of the same kind, and Mr. M. J. Parks, another neighbor, about 200 bushels.

"On about 17 acres sown the last days of October last, I gathered the rise of 580 bushels. The land has been in cultivation 20 years. Made a good crop of corn and peas on the land last year—plowed up stalks, sowed about $1\frac{1}{2}$ bushels to the acre, and turn them in with turning scooter—no manure."

MORGAN.—Several thousand bushels of rust proof oats for sale in this county. Mr. E. Hyzer, Madison, says: Mr. Grigg, one of our thrifty farmers, says, oats well drilled will make from 2 to 15 bushels more than when harrowed in, and 20 to 25 per cent. more than when plowed in. He thinks no crop pays better for a fair and judicious use of fertilizers.

OGLETHORPE.—More than half the county suffering for rain. Early planted corn has suffered and will be a complete failure unless rain falls soon.

PIKE.—G. R. Wilson, Hollersville, has 300 bushels rust-proof oats for sale.

PUTNAM.—Crops suffering for rain—none in four weeks. Upland corn will be ruined unless there is rain in a few days. Cotton small but healthy.

TALBOT.—No rain for three weeks with drying winds, which materially shortens the corn crop on old lands. Mr. L. B. McCrory, Bell View, says: "Where wheat

was sown by the 15th October and cotton seed used freely, it has made from ten to twelve bushels per acre. Late sowing with the same use of cotton seed yielded about one to two bushels per acre. I have noticed for twenty-five years that when wheat is sown by the 15th October it seldom fails to make a good yield."

TALIAFERRO.—A large portion of the county has been dry for several weeks causing crops to look badly though they are generally clean.

TROUP.—Some parts of the county have suffered for rain. Corn on upland small but has a good color. Col. C. W. Mabry, LaGrange, has 100 bushels rust-proof oats for sale. All oats except rust-proof a failure. Dr. H. H. Cary reports threshing sixty bushels per acre of rust-proof oats. Other varieties in the same field worth less.

WALTON.—Mr. V. H. Crawley, of Social Circle, says: "Mr. J. P. Upshaw made 1,700 bushels red rust-proof oats on 40 acres of upland, and has 1,500 bushels for sale. I have 150 bushels for sale. All other varieties a total failure, except the yellow rust-proof, which is as good as the red. No other oats will be sown in this section next year."

WARREN.—Suffering from drouth in some portions of the county; no rain for six weeks. All crops except cotton suffering seriously.

WILKES.—Suffering from drouth. Upland corn seriously injured. No general season since May 20th. Season in lower part of county June 29th.

SOUTHWEST GEORGIA.

CHATTANOOGHEE.—Very dry in this county. No rain, to do any good, in over five weeks. Very cool for June. No prospect now for rain.

CLAY.—Our experience is that the best time to sow oats is January.

CRAWFORD.—I am satisfied from several years experience that pea vines are the cheapest fertilizer for small grain, especially oats. I believe they are, to a considerable extent, a preventive of rust.

DOOLY.—The red rust-proof is the best variety planted. There could be several thousand bushels obtained from this county. These oats stood the test much better than any other. (Geo. Trippe, Drayton, Ga.)

DOUGHERTY.—Seasons very wet to May 22. Since then no general rain. June 24 some got good seasons. Corn is badly hurt. Part of cotton crop is very early and good; the other got very grassy, and was chopped late.

HOUSTON.—We are suffering from a five or six weeks drouth. Corn is seriously injured. A great deal of cotton is as small as ever seen in this county. Mr. H. C. Harris made 77½ bushels per acre on four acres of rust-proof oats.

LEE.—The wheat crop of this county was a complete failure; did not average a peck to the acre. The old red rust-proof oats have been sown here for six years and escaped rust, but this year they have failed. If the drouth continues the corn prospect will fall to 50 in the next ten days.

LOWNDES.—June season dry enough to favor cleaning crops—slight suffering for rain in some places, but, in main, season favorable to growth. Poor stands of cotton, offset by condition of crop and thrift of plants.

Have some doubt about correctness of report as to varieties of corn planted, not being expert in the nomenclature of different varieties of this cereal; would be pleased to have information on this point.

MACON.—No rain in 28 days. Corn cut off in consequence. Pea crop a fail-

ure up to date. Commenced raining yesterday. Cotton looking fresh and growing.

MARION.—Crops suffering very much for rain. Last good rain, 22d May. Worms are injuring the ears of corn very much. Crops of all kinds are in better condition than I ever saw them.

MILLER.—Crops very fine. The early corn is made. No casualty to cotton yet, and the weed is large and full.

QUITMAN.—The Burt oat is perhaps the earliest and most rapid in growth, free from rust. The Horn oat is perhaps more extensively grown than any other variety, free from rust and black heads. L. P. Dozier, W. P. McLendon, T. J. Nuthvin, and others, have them for sale.

The Newman's White Prolific corn sent to our society this spring, we think, will prove a complete success. We are suffering greatly for rain. (*J. E. Smith, Hatcher's Station.*)

SUMTER.—I am not satisfied that any particular variety of oats has escaped rust, but there is a vast difference.

We have had a very dry time until the 25th, when we had a good rain.

WEBSTER.—My oats seed were rust-proof last year—were not so this year.

The red oat I sowed in the spring escaped rust entirely. They were the Bancroft oat, and I bought them in Americus. *None for sale.*

WILCOX.—We are very dry. No rain in four weeks. Corn is failing fast, while cotton is little injured.

EAST GEORGIA.

BULLOCH.—Rains have been partial. Drouth has seriously injured crops in some localities. If we do not get rain soon there will not be half a provision crop made this year.

BURKE.—Crops generally in good condition. Cotton small. I do not think there can be an average crop of cotton made this season; and the corn crop will be cut off unless rains begin early in July.

DODGE.—No rain of consequence since May 6th. A few localities have had rain enough. Drouth terrible, with no prospect for rain.

At this writing we are having a severe drouth—six weeks to-day, July 3. Forward corn is too far spent, and late corn (except swamp) looks as if it would not make any crop at all.

JEFFERSON.—June has been very dry and hot. Corn almost ruined. Many have not planted peas. Cotton not much injured. Still dry.

No variety, either of wheat or oats, has escaped rust this season, and our farmers have very generally decided to try new varieties from a more northern latitude. An impression prevails that any variety of wheat or oats, if sown consecutively for a number of years, will rust—hence the determination to procure seed from northern latitudes.

LAURENS.—My yield of oats this year was about thirty bushels per acre. The variety sown was the Irwin county rust-proof. Used about fifteen bushels cotton seed per acre. Sowed about the first of January and plowed in deep with half shovel. There is a great demand for seed oats. I have sold out.

MONTGOMERY.—The only variety of oats in this county that did not rust, is called the Mexican. I got seed of its about ten years ago in Berrien county.

Those that have them here, have already had more applications than they can supply.

We are now having a most damaging drought. No general rain since June 1. Stock are suffering in some places for water.

SCREVIN.—The drought has well nigh ruined the corn. Cotton stands it better. In some localities rain has fallen but once since April—on the first of June. Corn cannot exceed 60.

I am satisfied that corn cannot yield more than half a crop. I have never seen cotton so small. Hog cholera is having full sway.

TELFAIR.—Just passed through a drought which commenced on 22d of May. No rain of any consequence till June 24, when good showers fell in some localities. Crops look well, having stood the drought remarkably.

TWIGGS.—In some sections of the county the drouth has continued—with the exception of one light shower—for eight weeks, and the corn is almost ruined and cotton is very small.

SOUTHEAST GEORGIA.

CHARLTON.—Oats almost an entire failure. There were none sown except those called "rust-proof," and they were destroyed by rust. On some farms not a bundle was saved. The crop was sown from seed that had not been destroyed by rust in any previous year.

CLINCH.—Corn is much above what it was this time last year, but there has been a great falling off in thirty day. I remarked in my last, that the cold easterly rain we had about 25th May, that the corn showed red or purple at the base of the stalk. It went on firing up to the silks. We had hot days and cool nights and twenty-four days drought which injured the corn crop 10 per cent.

COFFEE.—Crops in good condition and looking well. Several cases of blind staggers in horses, which generally is fatal. Can some one give a remedy?

PIERCE.—Crops injured very much by the long drouth. If we do not get rain in a very short time, all crops will be seriously damaged.

RUST-PROOF OATS FOR SEED.

In addition to those named in the foregoing "NOTES FROM CORRESPONDENTS," the following farmers also have rust-proof oats for sale:

R. L. McIntosh, Blakely, 500 bushels Mexican rust-proof, \$1.50 per bushel at the crib.

Thomas Hardeman, Davisboro, 200 bushels. Twenty acres made 1,000 bushels No rust.

J. V. Duke, Cuthbert, 1,500 bushels Mexican rust-proof, at \$2.00 per bushel; W. N. Coleman, Culverton, 300 bushels, at \$1.00 per bushel, sacked and delivered at depot.

Thos. V. S. Meagher, Oconee, 50 bushels of "Bland Oat"—rust-proof—at \$2.00 per bushel, sacked and delivered at depot.

S. S. Swindel, Taylor's Creek, 250 bushels "Camp Rust-proof Oats," at \$1.25 in lots of 50 bushels; \$1.50 for less than 50.

Geo. White, Sparta, 500 bushels rust-proof oats. Price on application.

R. B. Harrison and S. S. Everett, Lumpkin, 200 or 300 bushels genuine rust-proof oats, at \$1.50 per bushel.

WHEAT.

D. B. Cade, Jr., will sell 200 bushels of pure Bill Dallas rust-proof wheat, in two-bushel sacks, at \$6.00 per sack, delivered at depot. Mr. Cade claims to be the first to publish the merits of this variety, and says this is the twenty-first crop *without rust*.

HORN OATS, MEXICAN CLOVER.

Mr. Daniel A. Horn, Boston, Thomas Co., writes :

"I introduced the red rust-proof (bearded) here about 10 years ago. For the last five years there have been but few of any other kind planted. But from bad management of farmers, in selecting seed and cutting too green, they had in many instances deteriorated until they were not fit to be planted. I had anticipated this for several years; and two years ago selected, by hand, enough of the pure red oat to sow two acres. From this crop I planted, last fall, 60 acres, and they have entirely escaped rust, though injured by lice. They were carefully examined just before cutting, by a number of planters, and not a stalk could be found with rust. I also had 25 acres planted with seed not selected. They had considerable rust, but a most careful examination failed to find a single stalk of the red with rust on it; but all the white and black oats were killed out; and while cutting the 25 acres I found only two or three heads of the white oats.

"I am fully satisfied that fully matured seed will make much better crops. In 1860 I planted the yellow rust-proof, which had then just been introduced here. There were some black oats mixed with them, which rapidly increased. In 1864 (I think it was) the rust was very bad—almost destroying the old kinds of oats. The next year there was not a black oat in my crop, and never afterward, as long as I planted the yellow—which was until 1870.

"The oat I plant is the red rust-proof (bearded); but is known generally in Southwest Georgia as the 'Horn Oat,' from the fact that I introduced them here. The price at which seed oats have sold for the last few years hardly pays the cost of production, and I have produced but few above my own wants.

"My advice to all is to plant the oat we have (pure seed). I have tried every variety that I could get for the last twenty years, and this is the only one that has stood the test. I have no *axe to grind* and only make these statements so that if you see anything that would throw light on the subject, or be of value to the farming interest, you might use it—giving me a back seat."

* * "Some two years ago Dr. Janes sent me a small package of Mexican clover seed. I planted them in my garden and saved seed enough to plant a few patches. It grows finely and my stock appear fond of it. Hogs will leave pindars to eat it; mules, cows, and pigs eat all they can get of it. It does not grow much until after crops are laid by, and grows finely after all other grasses are done—and until hard frosts. My belief is that it will supply a much needed want—pasturage in the fall—and that it will make a first-rate fertilizer. When once set, it will keep the ground seeded and I think will come up after crops are laid by and make a good pasture and a good coat of manure to turn in. *It may become a pest*; would you advise setting my farm with it?"

The plant above described is the *Richardsonia Scabra*, described and illustrated in the annual report of the United States Department of Agriculture for 1878. This report contains several favorable allusions to the plant, among them the following from Mr. Charles Mohr, of Mobile, Ala.:

" Along the seaboard of this State the so-called Mexican clover is found spreading extensively; it covers the sandy upland soils completely with its prostrate, succulent, leafy stems, bearing the small white funnel-form flowers in terminal heads and axillary whorls. In regard to nutritive value it is scarcely inferior to clover; horses, cattle, and sheep are fond of it, particularly of the hay. As a green manure it is of the greatest benefit to the farmer in the lower pine region."

A plant with such valuable qualities, will hardly be considered a pest when it becomes fully known.

TABLE. I.—*Showing the comparative condition of Corn, and Cotton, the yield of Oats and Wheat, etc.*

NORTH GEORGIA.									
COUNTY	Corn, condition and prospect compared to an average.	Cotton, condition and prospect compared to an average.	Date of first Cotton bloom.	Oats, total product compared to last year.	Average yield per acre—bushels.	Rice, condition and prospect compared to an average.	Sugar-cane, condition and prospect compared to an average.	Sorghum, condition and prospect compared to an average.	Sweet Potatoes, condition and prospect comp'd to an average.
Banks.....	100	105	June 20	56	7	100	.....	87	100
Bartow.....	82	90	22	33	.....	10	100	10	100
Catoosa.....	100	100	.....	100	.....	90	100	90	100
Chattooga.....	90	110	" 23	25	7½	.....	90	100	100
Cherokee.....	87	100	" 18	25	7½	.....	100	100	100
Cobb.....	96	98	" 20	20	12	.....	60	100	100
Dade.....	95	105	July 2	65	.....	95	100	95	100
Dawson.....	98	99	.....	25	2¼	.....	90	101	101
Fannin.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Floyd.....	100	100	June 14	60	.....	80	100	80	100
Forsyth.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin.....	95	105	" 20	50	9	100	.....	100	105
Gilmer.....	110	.....	.....	.....	.....	110	110	110	110
Gordon.....	100	97	" 25	27	.....	87	95	87	95
Gwinnett.....	101	100	" 20	25	7	.....	85	90	90
Habersham.....	95	102	" 23	50	6	100	.....	105	102
Hall.....	90	100	" 25	100	20	.....	80	100	100
Average.....	96	102	June 20	47	8	100	.....	91	100

MIDDLE GEORGIA.									
COUNTY	Corn, condition and prospect compared to an average.	Cotton, condition and prospect compared to an average.	Date of first Cotton bloom.	Oats, total product compared to last year.	Average yield per acre—bushels.	Rice, condition and prospect compared to an average.	Sugar-cane, condition and prospect compared to an average.	Sorghum, condition and prospect compared to an average.	Sweet Potatoes, condition and prospect comp'd to an average.
Haralson.....	105	105	June 22	40	4	.....	.....	100	105
Hart.....	95	92	" 18	60	11	.....	.....	90	96
Jackson.....	98	98	" 18	70	7	.....	.....	98	100
Lumpkin.....	100	100	.....	50	.....	.....	.....	100	100
Madison.....	100	105	" 18	60	7	.....	.....	98	100
Milton.....	90	90	" 19	20	12	.....	.....	90	80
Murray.....	95	125	" 12	50	9	.....	.....	97	110
Paulding.....	95	100	" 16	25	2	.....	.....	60	110
Pickens.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Polk.....	90	100	.....	.....	.....	.....	.....	80	90
Rabun.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Townsend.....	90	.....	.....	90	.....	.....	.....	90	100
Union.....	80	.....	.....	.....	.....	.....	.....	90	100
Walker.....	98	102	" 24	37	5	.....	.....	98	101
White.....	87	112	.....	37	.....	100	.....	100	112
Whitfield.....	90	108	" 17	40	9	.....	.....	70	95
Average.....	84	88	June 16	72	13	90	88	89	95

TABLE I—Continued.

SOUTHWEST GEORGIA.

COUNTY	Corn, condition and prospect compared to an average.		Cotton, condition and prospect compared to an average.		Date of first cotton bloom.		Oats, total product compared to last year.		Average yield per acre—bushels.		Rice, condition and prospect compared to an average.		Sugar Cane, condition and prospect compared to an average.		Sorghum, condition and prospect compared to an average.		Sweet Potatoes, condition & prospect compared to an average.	
Baker.....	100	110	May 29	60	5 0	100	100	Macon ...	70	99	May 28	60	8	85	96	80	75	
Berrien....	110	100	" June 10	60	5 5	110	100	Marion ...	90	105	" 10	75	5	85	99	90	90	
Brooks	19	104	" 1	57	7 2	95	103	Miller.....	95	100	" 10	40	3	90	100	100	100	
Calhoun...								Mitchell..	90	100	May 25	50	4 5	100	100	100	100	
Chat'chee ..	75	90	" 13	100	12			Muscogee.	63	90	June 9	75	10	80	100	90	85	
Clay.....	90	120	" 18	55	8	95	110	Quitman .	70	95	" 11	80	12	100	100	100	80	
Colquitt..			" "					Randolph	90	100	" 8	65	12	95	100	100	100	
Crawford.	90	85	" 15	75	15		80	Schley.....	75	120	" 8	60	10	60	60	60	60	
Decatur....	85	100	" 12	50		100	100	Stewart....										
Deoly.....	85	90	" 1	60	8	95	95	Sumter....	87	100	" 7	60	12	100	103	94	94	
Dough'rt'y	77	95	" 1	40	3	90	92	Taylor.....	65	99		60	5	75	80	100	100	
Early.....	105	110	" 1	55	4 5	100	105	Terrell....	90	105	" 8	65	6	100	105	97	97	
Houston....	75	100	" 6	90	16		95	Thomas....	110	100	May 15	50	7	105	110	110	110	
Irwin.....	90	110	" 5	40		100	80	Webster..	85	85	June 10	57	13	90	90	90	90	
Lee.....	100	110	" 10	50	4	100	100	Wilcox....	80	90	May 11	40	6	80	70	75	75	
Lowndes..	100	104	" 5	40	6	100	106	Worth....	100	100	June 11	60	8	100	90	100	100	
								Average..	88	100	June 6	60	8	95	95	96	96	

EAST GEORGIA.

[illegible]

SOUTHEAST GEORGIA.

Appling...	90	105		50		105	100		100	Effingh'm	82			90	90	103	100		100
Bryan...										Glynn...	76	100	June 10	50	20	103	100		100
Camden...							100	100		Liberty...						100	90		100
Charlton...	100	100					100	100		McIntosh.									
Chatham...	80			25	6	100	90			Pierce...	125	100	" 1	75	10	100	100	100	125
Clinch....	92	100	June 5	75	6	101	101		100	Ware ...									
Coffee...	92	100		5	50	110	100		125	Wayne...									
Echols....										Average..	92	101	June 5	54	8	103	98	100	100

RECAPITULATION.

NORTH GEORGIA.....	96	102	June 20	47	8	100	.....	91	100
MIDDLE GEORGIA.....	84	88	" 16	72	13	90	88	89	95
SOUTHWEST GEORGIA.....	88	100	" 6	60	8	95	95	.....	96
EAST GEORGIA.....	79	95	" 7	66	13	90	87	74	87
SOUTHEAST GEORGIA.....	92	101	" 5	54	8	105	98	100	.....
General Average.....	87.5	96	.....	62	10.6	95	92	87	96

SUMMARY OF WEATHER REPORTS FOR JUNE, 1880.

NORTH GEORGIA.

STATIONS.	Temperature.		Mean Temperature.	Total Rainfall.	Last Good Season.	Days on which rain fell.
	Max.	Min.				
Canton	93.0	65.0	76.7	1.00	June 6.	6.
Ellerslie	88.0	54.0	71.0	0.90	May 28.	6, 29.
Gainesville	89.0	59.0	74.7	2.15	June 6.	1, 6, 13, 15, 25, 26, 28.
Leo (White county)	91.0	61.0	76.8	2.74	June 25.	1, 6, 8, 25, 26, 29.
Mt. Airy	92.0	62.0	76.2	3.34	June 26.	1, 6, 7, 11, 25, 26.
Rabun Gap	91.0	60.0	71.7	1.85	June 6.	1, 6, 11, 15, 26, 29.
Rome	92.0	59.0	77.0	2.35	June 25 to 28.	1, 6, 8, 25, 26, 28.
Toccoa	99.0	64.0	79.2	3.22	June 25, 26.	1, 2, 3, 25, 26.
Means	91.8	60.5	74.6	2.19	.....	.....

MIDDLE GEORGIA.

Athens	96.0	65.0	82.1	3.24	June 26.	1, 7, 25, 26, 29.
Atlanta	92.0	59.0	76.0	5.30	June 25.	1, 7, 10, 13, 24, 25, 26, 29.
Carrollton	95.0	65.0	76.1	3.35	June 23 to 26.	1, 7, 23, 24, 26.
LaGrange	94.0	65.0	78.7	1.80	June 6 to 10.	1, 6, 10, 15, 25.
Macon	92.0	67.0	78.5	1.40	June 30.	10, 23, 25, 30.
Oxford	94.0	64.0	77.1	3.05	June 25.	1, 8, 24, 25, 26.
Thomson	98.0	66.0	79.2	0.00	May 21.	.....
Woodbury .....	.....	.....	.....	.....	.....	.....
Means	94.4	64.4	78.1	2.52	.....	.....

SOUTHWEST GEORGIA.

Americus	95.0	65.0	81.7	1.65	June 25.	9, 10, 24, 25.
Cuthbert .....	.....	.....	.....	.....	.....	.....
Nashville	95.0	71.0	81.9	1.75	June 24.	10, 24.
Thomasville	95.0	71.0	80.5	3.84	June 24.	1, 8, 10, 11, 14, 21, 23, 24.
Means	95.0	68.0	81.1	2.74	.....	.....

EAST GEORGIA.

Augusta	95.0	66.0	78.5	0.72	May 23.	2, 16, 29, 30.
McRae	10.2	67.0	81.8	1.80	June 24.	2, 24, 25.
Ogeechee	99.0	69.0	83.0	0.20	May 23.	2, 7, 24.
Swainsboro	102	64.0	83.6	1.48	June 25.	1, 7, 25.
Means	98.7	66.3	81.7	0.80	.....	.....

SOUTHEAST GEORGIA.

Blackshear	99.0	67.0	82.0	1.14	June 22.	21, 22.
Brunswick	101	71.0	84.5	2.84	June 24.	2, 3, 15, 16, 21, 23, 24, 25, 30.
St. Mary's	99.0	68.0	80.1	1.62	June 24 to 27.	1, 2, 5, 9, 23, 24, 27, 29.
Walthourville .....	.....	.....	.....	.....	.....	.....
Means	99.0	70.0	81.5	2.55	.....	.....
Means for State	94.9	64.5	78.2	2.22	.....	.....

Special Circular No. 8. }
NEW SERIES. }

REPORT OF GROWING CROPS, ETC., FOR THE MONTH OF JULY 1880.

RETURNABLE AUGUST 1st, 1880.

DEPARTMENT OF AGRICULTURE,

ATLANTA, GA., July 10, 1880.

DEAR SIR—Please answer the following questions **on the 1st day of August**, or a few days before, if necessary, and mail promptly, so that your report may reach this office **by the Third of August**.

Answer every question, that will permit of it, in numbers indicating per cent.

An AVERAGE CROP, or AVERAGE CONDITION, or anything with which comparison is made, is always taken as 100. Thus, if the corn crop at any time is 10 per cent. better than last year, or 10 per cent better than an average, it should be reported as 110 in each case; and if ten per cent. below these standards, it should be 90. Never report "10 per cent. better" or "10 per cent. worse," but 110 or 90, as the case may be. So avoid vague comparisons, such as, "some better," "hardly so good," "above an average," etc.

In making up your answers, let them apply to the whole county in which you reside, or as far in every direction as your knowledge may extend, *not simply to your own farm.*

If a crop about which questions are asked is not grown in your county, use the character **X**. If you have not sufficient data to make an approximate estimate, leave the space blank.

Very Respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

I. For what county do you report?.....county.

II. Your name?

III. Your post-office?.....

CONDITION AND PROSPECT AUGUST 1ST, COMPARED
to an average, of—

1. Cotton?.....per cent.
2. Corn?.....per cent.
3. Rice?.....per cent.
4. Sugar cane?.....per cent.
5. Sorghum?.....per cent.
6. Field peas?.....per cent.
7. Chufas?.....per cent.
8. Sweet potatoes?.....per cent.
9. If any, what casualty is affecting cotton?.....
10. To what extent has it injured the prospect?..... per cent.
11. What is the prospect of *pork hogs* for next winter, compared with last year?.....per cent.
12. Have seasons, during July, been favorable or unfavorable?.....
13. Date of last good rain?.....date.
14. Date of making this report?.....date.

AGRICULTURAL CLUBS.

I will be obliged if you will give below the name and post-office address of the Secretary of each Farmers' Club or County Agricultural Society in your county, viz:

Name of club or society?.....

.....

Name of Secretary?.....

His post-office address?.....

GRANGES.

If any active Granges, please give the name, number of Grange, and name and address of Secretary, viz:

Name of Grange?.....

Number of Grange?.....

Name of Secretary?.....

His post-office address?.....

NOTE.—The above information is desired for the purpose of fair and equitable distribution of seeds, pamphlets, etc.

REMARKS.

Under this head report any facts of general interest to the farmers, or any valuable or instructive experiments, or suggestions for the benefit of farmers. Such remarks should be pointed and concise, and plainly written.

..... County.

..... Reporter.

Special Circular No. 9. }
NEW SERIES. }

STATE OF GEORGIA,
DEPARTMENT OF AGRICULTURE,
ATLANTA, July 12, 1880.

DEAR SIR—Believing that a concise history of the manufacturing industries of the State, would not only be of general interest to the business public, but tend to encourage the introduction and investment of additional capital and promote general prosperity, I have prepared a number of questions for the purpose of eliciting from manufacturers of cotton and wool, the necessary information upon that subject. The questions explain themselves; and I will be obliged if you will insert your answers to the same in the blank spaces left for that purpose. A short historical sketch of your enterprise, giving names of founders, with dates, and interesting incidents connected therewith, would be very acceptable, and is respectfully invited. (This should be on separate paper and in form for use.)

If you should consider any of the questions improper to be asked, or that it would be impolitic to answer them in detail, of course you will disregard the same, or modify your answer according to your own judgment.

As I desire very much to issue the proposed publication at as early a day as practicable, I will thank you for your early attention to the matter.

I am very respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

1. Your name?.....
2. Post-office address?.....
3. Name of your factory?.....
4. Name of owner or company?.....
5. When did the factory commence operations?.....
6. Where located—town?..... County?.....
7. On what line of railroad?.....
8. Cost of plant?.....
9. Capital used in business?.....
10. Number ring spindles for cotton?..... Mule spindles?.....
11. Number of looms for cotton?.....
12. What numbers of cotton yarns spun?.....
13. What kind of goods manufactured?.....
.....
.....
14. Principal market for cotton goods?.....
15. Operatives employed—adults..... Children under 15?.....

Males?..... Females?.....
16. Average pay per hand per day?.....
17. Average hours run per day?.....

18. Average profits—per cent on capital employed?.....

19. Pounds cotton used per day?.....

20. Number bales used during last fiscal year?.....

21. What power—water or steam?.....

Fuel—wood or coal?.....

Cost per cord or ton delivered?.....

22. If water—what amount (in H. P.) used?.....

23. Extent of rapids or shoals?.....

Aggregate fall in this distance?.....

Total available horse power?.....

24. Character of surrounding country—level, hilly, clay or sandy soil, health, water, etc. State any facts exhibiting the advantages as a manufacturing locality.

Questions 10, 11, 12 and 13 refer to cotton manufacturers only, and therefore will not be answered by those who manufacture wool only. The other questions refer to both cotton and wool. The following refer to wool manufacturers only:

25. Number of sets of wool cards?.....

26. Number of roll cards for custom work?.....

27. Number of looms?.....

28. Pounds of washed wool used per day?.....lbs.
29. What hank yarn spun?
30. Pounds rolls made per year?lbs.
31. Do you make jeans, or any *fulled* and finished goods?—How many yards of each per annum—
jeans?.....yds; fulled and finished.....yds.
32. Number yards all wool goods (warp and filling) made per annum?..... yds.
33. What proportion of wool used is grown in Georgia?.....per cent. What is the
principal source of the remainder?.....
34. Percentage of loss of wool in manufacturing?.....per cent
35. How does the loss in cleaning and working Georgia wools compare with the same of other
wools?.....
36. Average price per pound of wool in the dirt?... ..cents
37. Average price per pound of tub-washed wool?.....cents
38. Is the business of manufacturing wool in Georgia, on the whole, encouraging?.....
39. Is there much attention paid by growers to rolling and tying each fleece separately?.....
40. Would this plan of putting up the fleece be of advantage to the manufacturer?... ..

ANALYSES AND STATISTICS

OF

COMMERCIAL FERTILIZERS

INSPECTED, ANALYZED AND ADMITTED TO SALE
IN GEORGIA.

DURING THE SEASON OF 1879-80.

J. T. HENDERSON,
COMMISSIONER OF AGRICULTURE.

ATLANTA, GEORGIA,
1880.

JAS. P. HARRISON, & Co., Printers and Binders,
Atlanta, Georgia.

Analyses and Statistics of Fertilizers.

Season of 1879-80.

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA., July 24, 1880.

EXPLANATIONS OF THE TABLES OF ANALYSES.

The tables commencing on the next page show the analyses of commercial fertilizers and chemicals which have been inspected, analyzed and admitted to sale in Georgia for the season of 1879-80, and also those brands which fell below the legal standard, and were not admitted to sale.

In arranging the tables, the chemical determinations to which no value is attached are first given, viz : Moisture, and insoluble phosphoric acid.

Next are given the determinations of valuable ingredients, viz : Soluble and precipitated phosphoric acid, ammonia and potash.

(The soluble and precipitated phosphoric acid are entered in separate columns, but being of equal value, the same money value is given them; hence the sum of these two is placed in one column, making the total available phosphoric acid.)

The determinations in the analyses are given in *percentages*.

After the chemical determinations are the "relative commercial values," or estimate of the comparative *real worth* of the valuable ingredients found by analysis in a ton of each fertilizer. If each fertilizer contained but one valuable ingredient, the percentages of that ingredient would correctly represent the comparative value of the fertilizer. But as a large majority of the brands contain two or more ingredients differing widely in agricultural and commercial value, and in the percentages in which they enter into the composition, it is found very convenient to add together the calculated commercial value, in dollars and cents, of each ingredient, as a basis of comparison, and as a guide to the purchaser.

The following prices *per pound* of the valuable ingredients or elements of plant food found in the fertilizers by analysis, have been adopted as a practical approximation to their true value at Savannah, viz :

Available Phosphoric Acid.....	12½ cents per pound.
Ammonia.....	18 cents per pound.
Potash.....	8 cents per pound.

The relative commercial values are calculated as follows: The "available phosphoric acid," "ammonia" and "potash" being the valuable ingredients for which the farmer pays his money, they, only, are considered in ascertaining the commercial value. The numbers in the respective columns of these ingredients, indicate the *number of pounds* of each in one hundred pounds of the fertilizer.

To ascertain the value of the available phosphoric acid in a fertilizer, multiply the number in that column by 12½ (the value in cents of one pound) for the value of that element in 100 pounds; which product, multiplied by 20 (twenty times 100 pounds makes 2,000 pounds, or one ton,) will give the value of the available phosphoric acid in one ton.

Multiply the number of pounds of ammonia by 18 (the value in cents of one pound.) This product, multiplied by 20, will give the value of the ammonia in a ton.

Multiply the potash by 8 (the value in cents of a pound), and the product by 20, which will give the value of potash in a ton.

Then add these values together, and you will have the relative commercial value of a ton of the fertilizer.

TABLES of Analyses, Relative Commercial Values, etc., of Commercial Fertilisers inspected, analysed and admitted to sale in Georgia for the Season 1879-80.

TABLE I.—AMMONIATED SUPERPHOSPHATES OF LIME.

NAMES OF FERTILIZERS.										Phosphoric Acid.		By Whom and Where Sold, or for Whom Inspected and Analyzed.		By Whom and Where Manufactured.			
Moisture.		Insoluble.	Soluble.	Reverted.	Total Available.	Ammonia.		Potash.	Relative Commercial Value.								
14.70	3.28	5.10	3.28	8.38	2.04	0.84	Lorentz & Rittler, Atlanta, Ga.	\$29.64	Lorentz & Rittler, Baltimore, Md.								
18.80	1.62	7.45	2.92	10.37	3.06	1.06	B. J. Cubbedge, Savannah, Ga.	38.63	Rafferty & Williams, New York.								
13.13	8.43	6.80	1.23	8.03	2.40	2.40	B. J. Cubbedge, Savannah, Ga.	31.12	Chesapeake Guano Co., Baltimore, Md.								
11.02	4.35	6.70	4.46	11.16	2.70	2.23	41.18 Holmes & Durham, Charleston, S. C.	41.18	Danliman Bros., Baltimore, Md.								
11.85	2.76	6.04	4.08	10.12	2.03		61.4 H. Atkins & Co., Gainesville, Ga.	32.61	Chemical Co. of Canton, Baltimore, Md.								
12.11	1.73	8.56	4.76	10.42	3.10	2.38	41.02 Baldwin & Co., Savannah, Ga.	62.02	Baldwin & Co., Newark, N. J.								
12.14	2.16	8.70	3.56	12.26	2.52	1.47	47.07 Baldwin & Co., Savannah, Ga.	42.07	Baldwin & Co., Newark, N. J.								
16.30	2.52	6.70	3.56	11.80	2.04	1.29	38.91 Baldwin & Co., Savannah, Ga.	38.91	Baldwin & Co., Newark, N. J.								
16.10	2.50	8.70	3.04	11.80	2.04	1.12	36.59 A. C. & F. W. Wily, Atlanta, Ga.	36.59	Chemical Co. of Canton, Baltimore, Md.								
11.02	4.20	7.30	3.94	11.04	2.06	0.84	J. A. Bale, Rome, Ga.	37.93	Walton, Whann & Co., Wilmington, Del.								
10.15	4.07	6.90	1.73	8.03	2.06	0.84	37.93 Walton, Whann & Co., Savannah, Ga.	37.93	Ed. Barry & Co., Augusta, Ga.								
10.62	4.37	6.90	2.27	9.17	2.95	2.40	34.53 Ed. Barry & Co., Augusta, Ga.	34.53	Ed. Barry & Co., Augusta, Ga.								
9.75	3.84	4.50	3.87	8.20	2.70	0.82	59.72 Ed. Barry & Co., Augusta, Ga.	59.72	Baugh & Sons, Baltimore, Md.								
12.87	2.75	4.50	4.22	8.72	2.04	0.36	35.38 George Shaeffer, Hampton, Ga.	35.38	P. S. Chappell & Son, Baltimore, Md.								
16.30	1.74	7.00	2.90	9.90	3.12		37.32 P. S. Chappell & Son, Baltimore, Md.	37.32	Bradley Fertilizing Co., Boston, Mass.								
16.87	2.50	7.05	3.65	10.70	2.02	2.06	35.64 Langston & Crane, Atlanta, Ga.	35.64	Bradley Fertilizing Co., Boston, Mass.								
11.71	2.90	8.19	1.48	9.67	3.35	0.25	34.55 Langston & Crane, Atlanta, Ga.	34.55	Winf. Id. Peters, Baltimore, Md.								
13.14	3.15	7.81	1.90	9.11	3.16	0.25	39.98 Winfield Peiers, Baltimore, Md.	39.98	E. B. Burgess & Son, Burgess Store, Va.								
12.20	5.46	5.69	2.31	8.00	2.34	0.88	32.00 B. J. Burgess, Athens, Ga.	32.00	P. Zell & Son, Baltimore Md.								
13.00	3.48	6.90	2.66	9.56	2.02	0.52	36.10 P. Zell & Son, Baltimore, Ga.	36.10	Bradley Manufacturing Co., Boston, Mass.								
14.17	3.45	6.20	3.43	9.63	2.16	2.56	39.35 H. M. Comer, Savannah, Ga.	39.35	R. W. L. Kainin & Co., Baltimore, Md.								
13.10	0.26	9.53	1.61	11.16	3.18		29.34 B. J. Cubbedge, Savannah, Ga.	29.34	Chesapeake Guano Co., Baltimore, Md.								
14.35	3.70	2.75	5.40	8.15	2.28	0.60	41.31 B. J. Cubbedge, Savannah, Ga.	41.31	Stono Phosphate Co., Charleston, S. C.								
12.60	4.40	4.06	8.11	12.17	2.48	0.60	37.78 J. W. Goldsmith & Co., Atlanta, Ga.	37.78	P. S. Chappell & Son, Baltimore, Md.								
11.45	1.80	2.95	5.80	9.75	2.88	1.90	39.69 Geo. W. Scott & Co., Atlanta, Ga.	39.69	Maryland Fertilizing Co., Baltimore, Md.								
12.80	3.75	6.05	3.98	10.03	3.75	0.70	43.36 P. S. Chappell & Son, Baltimore, Md.	43.36	Chemical Co. of Canton, Baltimore, Md.								
15.20	2.15	8.20	3.10	11.30	3.30	2.02	35.00 J. C. Bruyn, Savannah, Ga.	35.00	Bone Company, Portland, Maine.								
18.60	3.83	6.70	3.30	10.00	2.04	1.66	33.00 J. C. Bruyn, Savannah, Ga.	33.00	Bone Company, Portland, Maine.								
12.95	4.84	3.93	4.56	8.49	2.56	1.62	33.00 J. C. Bruyn, Savannah, Ga.	33.00	Bone Company, Portland, Maine.								
10.47	5.95	3.60	3.94	9.54	2.40	1.20	34.45 Jas. B. West & Co., Savannah, Ga.	34.45	Bone Company, Portland, Maine.								
12.32	4.92	6.15	2.40	8.55	2.28	1.18	31.37 Chas. Ellis, Savannah, Ga.	31.37	Bone Company, Portland, Maine.								
12.92	1.89	6.01	4.98	11.53	2.20	1.18	38.63 Chas. Ellis, Savannah, Ga.	38.63	Bone Company, Portland, Maine.								
do										Av. 4 subsequent inspections							

DeLeon's Complete Cotton Fert'zer.....	10.10	2.48	4.60	4.95	2.02	0.64	32	P. M. DeLeon, Savannah, Ga.....	P. M. DeLeon, New York.	
Dixie Guano.....	14.35	3.70	2.75	5.40	8.15	2.28	29 54	R. W. L. Ralsin & Co., Baltimore, Md.	R. W. L. Ralsin & Co., Baltimore, Md.	
Dixie Phosphate.....								Alex. Concher, Augusta, Ga.....	Dixie Fertilizer Co., Augusta, Ga.	
Dixie Ammoniated Phosphate.....								Alex. Concher, Marietta, Ga.....	Dixie Fertilizer Co., Augusta, Ga.	
Dissolved Bone.....	15.02	3.30	5.45	8.14	2.50	2.02	0.74	42 43	A. A. Fletcher, Marietta, Ga.....	Northwestern Fert'z'r Co., St. Louis, Mo.
Double Anchor Guano.....	21.25	2.50	6.90	2.26	9.41	2.28		30 60	Stadford, Bladock & Co., Barnesville, Ga.	Read & Co., New York.
Dobbs' Ammoniated Cotton Guano.....	11.62	2.20	7.15	2.28	9.41	2.28		33 25	S. C. Dobbs, Athens, Ga.....	Read & Co., Warren Island.
Dobbs' Chemicals.....	21.25	0.90	9.55	1.19	10.74	2.00		34 03	S. C. Dobbs, Athens, Ga.....	Read & Co., New York.
East St. Louis Packing Co. Fertilizer.....	14.60	0.87	8.17	2.34	10.51	2.40		43 11	Barrett & Carswell, Augusta, Ga.	Bradley Fertilizer Co., Boston, Mass.
Engel's Ammoniated Bone Phosphate.....	14.60	3.50	1.50	6.50	8.00	6.42		38 14	A. P. Youngblood, Atlanta, Ga.	East St. Louis Packing Co., St. Louis, Mo.
E. Frank Cue's Am'd Bone Sup. Phos.	18.85	2.60	4.85	4.75	9.61	2.10		35 18	D. G. Purse, Savannah, Ga.	E. Frank Cue, Philadelphia, Pa.
English & Huggenit Acid Phosphate.....	15.50	4.48	5.75	2.27	8.02	2.70		31 47	Pelzer, Rogers & Co., Charleston, S. C.	K. W. L. Ralsin & Co., Baltimore, Md.
Empire Guano.....	15.32	2.50	7.60	1.70	9.30	2.82		36 08	H. T. Inman, Atlanta, Ga.	Etianw 'phosphate Co., Charleston, S. C.
Etianw Guano.....	13.75	3.01	7.60	1.70	9.30	2.81		33 37	C. A. Chaslin, Charleston S. C.	Robertson, Taylor & Co., Charleston, S. C.
Etianw Fertilizer.....	13.75	3.01	7.60	1.70	9.30	2.81		33 37	Robertson, Taylor & Co., Charleston, S. C.	Robertson, Taylor & Co., Charleston, S. C.
Etianw Fertilizer (deep black).....	12.50	4.05	5.50	2.09	10.59	3.06		37 49	Robertson, Taylor & Co., Charleston, S. C.	Robertson, Taylor & Co., Charleston, S. C.
Etianw Fertilizer (brown).....	9.15	2.55	8.60	2.23	10.83	3.60		40 04	Robertson, Taylor & Co., Charleston, S. C.	Robertson, Taylor & Co., Charleston, S. C.
Etianw Fertilizer (light brown).....	9.15	2.55	8.60	2.23	10.83	3.60		40 04	Robertson, Taylor & Co., Charleston, S. C.	Robertson, Taylor & Co., Charleston, S. C.
Eureka Am't Bone Sup. Phos. of Lime.....	12.16	4.71	6.70	2.66	9.36	2.46		32 26	J. M. Johnston & Co., Macon, Ga.	Atlantic & Va. Fertilizer Co., Orient, L. L.
Excellenza Fertilizer.....	14.75	3.25	10.55	1.10	11.65	2.70		38 84	Jno. K. Long & Co., Baltimore, Md.	John R. Long & Co., Baltimore, Md.
Farmer's Friend.....	6.12	3.25	7.70	1.70	9.40	2.82		33 65	Stadford, Bladock & Co., Barnesville, Ga.	Read & Co., New York.
Franklin Am'd Dis. Bone.....	8.65	4.34	5.15	5.10	10.25	3.12	0.92	33 33	P. M. DeLeon, Savannah, Ga.	P. M. DeLeon, New York.
Georgia Fertilizer.....	15.03	2.50	8.43	0.71	9.14	2.32		33 25	Chas. C. Hardwick, Savannah, Ga.	Preston Fertilizer Co., New York.
Georgia State Grange Fertilizer.....	16.39	2.74	9.14	0.90	10.04	3.36		37 20	Baldwin & Co., Savannah, Ga.	Baldwin & Co., Newark, N. J.
Giant Guano.....	14.35	3.70	2.75	5.40	8.15	2.28	0.60	29 54	Wright & Crane, Augusta, Ga.	R. W. L. Ralsin & Co., Baltimore, Md.
Gossypium Phospho.....	5.73	2.58	4.58	6.02	9.55	2.81	1.76	89 31	Geo. W. Scott & Co., Atlanta, Ga.	Geo. W. Scott & Co., Atlanta, Ga.
Grange Mixture.....	12.93	4.81	3.93	4.58	8.49	1.58	1.62	33 03	D. B. Hull, Savannah, Ga.	Patasco Guano Co., Baltimore, Md.
Grange Mixture.....	16.66	2.15	3.94	3.61	9.55	2.61	1.23	37 09	M. A. Stovall, Augusta, Ga.	Patapasco Chemical Works, Augusta, Ga.
High Grade Am'd Sup. Phos.....	13.82	2.20	8.00	3.00	11.00	2.22	1.00	37 09	M. W. Johnson & Co., Atlanta, Ga.	Wm. Davidson & Co., Baltimore, Md.
High Grade Nitro-Phosphate.....	10.82	6.38	3.87	5.90	9.75	2.22		32 37	J. W. Straw, Philadelphia, Pa.	Farmers' Bone and Fertz. Co., Phila., Pa.
Hope Guano.....	14.35	3.70	2.75	5.40	8.15	2.28	0.60	29 54	Wright & Crane, Augusta, Ga.	R. W. L. Ralsin & Co., Augusta, Ga.
Homestead Guano.....	14.80	0.51	8.95	7.74	9.69	2.62		34 37	West Bros., Savannah, Ga.	Michigan Carbon Works, Detroit, Mich.
Horner's South Sea Guano.....	12.90	1.68	7.95	2.72	10.67	2.84	1.58	38 34	Drum, Oglethorpe & Co., Atlanta, Ga.	Joshua Horner, Baltimore, Md.
Inman's Imperial Guano.....	16.17	2.50	5.30	3.62	8.20	3.00	.84	32 64	J. H. Inman & Co., Atlanta, Ga.	John H. Inman & Co., New York.
Inman's San Domingo Guano.....	12.15	4.00	6.20	3.62	10.12	2.76		35 25	J. H. Inman & Co., Atlanta, Ga.	J. H. Inman & Co., New York.
King Guano.....	14.35	3.70	2.75	5.40	8.15	2.28	0.60	29 54	R. W. L. Ralsin & Co., Baltimore, Md.	R. W. L. Ralsin & Co., Baltimore, Md.
Lion Acid Phosphate.....	18.35	2.50	4.85	4.76	9.61	2.10	2.25	35 18	Pelzer, Rogers & Co., Charleston, S. C.	Atlantic Phosph. Co., Charleston, S. C.
Lion Guano.....	13.70	3.10	3.85	4.84	8.69	2.09	.48	30 00	N. L. & C. Anier, Atlanta, Ga.	R. W. L. Ralsin & Co., Baltimore, Md.
Lieber's Am'd Dissolved Bone.....	12.95	4.84	3.93	4.86	8.49	2.56	1.62	33 03	D. B. Hull, Savannah, Ga.	Patapasco Guano Co., Baltimore, Md.
Lister Bros. Standard Pure Bone.....	17.77	2.10	8.35	2.50	10.85	2.28	0.96	36 87	Baldwin & Co., Savannah, Ga.	Lister Bros., Newark, N. J.
do (Subsequent inspection).....	12.73	3.16	6.12	3.57	9.69	2.38	1.47	35 35	Baldwin & Co., Savannah, Ga.	Lister Bros., Newark, N. J.
*Lister Bros. Crescent Bone Fertilizer.....	14.15	2.25	6.30	3.26	9.69	2.20	1.10	33 58	Baldwin & Co., Savannah, Ga.	Lister Bros., Newark, N. J.
Lowes Georgia Formula.....	14.55	4.50	4.25	4.10	8.35	2.04	1.94	31 32	M. A. Stovall, Augusta, Ga.	Gorgia Chemical Works, Augusta, Ga.
L. & R. Am'd Soluble Phosphate.....	13.72	5.40	5.50	3.86	9.36	2.01	1.82	82 57	Lorenz & Rittler, Baltimore, Md.	Lorenz & Rittler, Baltimore, Md.
Lilly's Early Opener.....	13.57	4.35	6.00	2.75	8.92	2.27	1.55	31 95	Hugh T. Inman, Atlanta, Ga.	R. W. L. Ralsin & Co., Baltimore, Me.
Maddox, Rucker & Co., Cotton Guano.....	13.57	4.35	6.00	2.75	8.92	2.27	1.55	31 95	Maddox, Rucker & Co., Atlanta, Ga.	R. W. L. Ralsin & Co., Baltimore, Md.
Mapes Nitrogenized Superphosphate.....	16.20	5.29	3.05	6.36	9.11	2.27	.31	57 52	E. Z. Lane, N. Y.	Mapes Formula Peruvian Co., N. Y.
Mastodon Am'd Superphosphate.....	16.66	2.15	3.91	5.51	9.55	2.64	2.82	37 69	M. A. Stovall, Augusta, Ga.	Georgia Chemical Works, Augusta, Ga.
Mathis' Chemical Fertilizer.....	12.62	5.25	5.73	2.61	8.39	2.16	1.77	31 58	R. J. Baker & Co., Baltimore, Md.	R. J. Baker & Co., Baltimore, Md.
*Merryman's Am'd Dissolved Bone.....	14.35	1.46	9.96	1.93	11.89	2.80	0.29	49 27	Jno. Merryman & Co., Baltimore, Md.	Jno. Merryman & Co., Baltimore, Md.
Minor's Superphosphate.....	15.60	4.50	5.15	3.52	8.67	2.70	.91	32 83	B. B. Minor, Jr., Savannah, Ga.	Patapasco Guano Co., Baltimore, Md.

TABLE I.—Continued.

NAMES OF FERTILIZERS.	Phosphoric Acid.					Potash.	Relative Commercial Value.	By Whom and Where Sold, or for Whom Inspected and Analyzed.	By Whom and Where Manufactured.	
	Moisture.	Insoluble.	Soluble.	Reverted.	Total Available.					
Mound City Guano.....	12.82	0.58	5.40	6.73	12.13	2.12	\$37 96	A. A. Fletcher, Marietta, Ga.....	North Western Fer. Co. St. Louis, Mo.	
Monarch Guano.....	14.70	3.05	10.70	2.28	12.98	2.40	42 57	J. H. Inman & Co., Atlanta, Ga.....	J. H. Inman & Co., New York.	
National Bone Dust.....	16.50	.97	2.15	5.38	8.13	2.88	30 63	A. A. Fletcher & Co., Marietta, Ga.....	North Western Fer. Co., St. Louis, Mo.	
National Am'd Sol. Phosphate.....	10.80	2.10	7.05	4.40	11.45	2.28	39 31	U. S. Fer. and Chem. Co., Philadelphia.....	U. S. Fer. and Chemical Co., Phila.	
Nava sa Guano.....	14.02	5.25	4.30	5.78	10.08	2.21	0.71	34 32	Navassa Guano Co., Wilmington, N. C.....	Navassa Guano Co., Wilmington, N. C.
Nova Sa Guano.....	14.55	8.20	1.00	7.50	8.50	2.40	2.25	33 49	G. W. Germany, Savannah, Ga.....	J. N. Spencer, Havre De Grace.
Number One Albermarle Guano.....	7.77	1.80	5.60	2.80	8.40	4.26	36 34	Ketchum & Co., Savannah, Ga.....	Ketchum & Co., Savannah, Ga.	
Number One Sol. Sup. Phos. of Lime.....	11.40	3.27	8.00	1.12	9.12	3.06	1.17	35 69	G. Ober & Sons, Baltimore, Md.....	G. Ober & Son, Baltimore, Md.
Old Dominion Fertilizer.....	11.60	5.10	5.80	2.82	8.62	2.61	1.30	35 34	Maddox, Rucker & Co., Atlanta, Ga.....	E. B. Burgess & Son, Burgess' Store, Va.
"Old B".....	16.66	2.15	3.94	5.61	9.55	2.61	1.22	37 09	M. A. Stovall, Augusta, Ga.....	Georgia Chemical Works, Augusta, Ga.
Orient Complete Manure.....	15.66	2.86	6.50	1.74	8.21	2.61	2.32	37 09	J. M. Johnston & Co., Macon, Ga.....	Atlantic and Va. Fer. Co., Orient, L. I.
Orient Am'd Bone Phosphate.....	7.73	2.24	6.40	2.58	8.98	2.76	2.11	33 37	J. M. Johnston & Co., Macon, Ga.....	Atlantic and Va. Fer. Co., Orient, L. I.
Patapasco Guano.....	16.66	2.15	3.94	5.61	9.55	2.61	2.32	37 09	J. M. Johnston & Co., Macon, Ga.....	Atlantic and Va. Fer. Co., Orient, L. I.
Patapasco Am'd Sol. Phosphate.....	12.95	4.84	3.93	4.56	8.49	2.56	2.32	37 09	J. M. Johnston & Co., Macon, Ga.....	Atlantic and Va. Fer. Co., Orient, L. I.
Patapasco Am'd Sol. Phosphate.....	16.66	2.15	3.94	5.61	9.55	2.61	1.62	37 09	J. M. Johnston & Co., Macon, Ga.....	Atlantic and Va. Fer. Co., Orient, L. I.
Pendleton's Am'd Super Phosphate.....	10.25	2.90	9.35	2.00	11.35	3.02	1.80	42 12	E. M. & W. N. Pendleton, Atlanta, Ga.....	Georgia Chemical Works, Augusta, Ga.
Planters' Favorite.....	16.15	1.29	9.45	1.10	10.55	2.10	1.80	42 12	E. M. & W. N. Pendleton, Atlanta, Ga.....	Georgia Chemical Works, Augusta, Ga.
Plow Brand Raw Bone Super. Phos.....	10.62	4.37	6.90	2.27	9.17	2.95	2.40	33 93	J. H. Inman & Co., Savannah, Ga.....	John K. Long & Co., Baltimore, Md.
Pollard's Soluble Bone.....	18.35	2.50	4.85	4.75	9.61	2.10	2.25	33 93	Walton, Whann & Co., Baltimore, Md.....	John K. Long & Co., Baltimore, Md.
Pomona Guano.....	15.42	1.20	7.10	2.30	9.40	2.82	2.25	35 18	Robertson, Taylor & Co., Charleston S. C.....	Robertson Taylor & Co., Charleston, S. C.
Potomac Guano.....	14.35	3.70	2.75	5.40	8.15	2.28	0.60	29 54	R. W. L. Ralston & Co., Baltimore, Md.....	Robertson Taylor & Co., Charleston, S. C.
Preston & Son's Am'd Bone Sup. Phos.....	12.60	2.25	7.80	1.86	9.60	3.12	0.60	29 54	R. W. L. Ralston & Co., Baltimore, Md.....	Robertson Taylor & Co., Charleston, S. C.
Pure Dissolved Raw Bone and Potash.....	13.05	1.80	5.25	6.50	11.75	2.16	2.61	35 28	R. W. L. Ralston & Co., Baltimore, Md.....	Robertson Taylor & Co., Charleston, S. C.
Pure Dissolved S. C. Bone.....	20.05	0.15	6.63	1.41	8.04	2.47	1.11	41 82	R. W. L. Ralston & Co., Baltimore, Md.....	Preston & Son, Green Point, L. I.
Pure Am'd Dissolved Bone, S. C.....	8.45	2.70	9.00	3.24	12.24	3.24	1.11	41 82	R. W. L. Ralston & Co., Baltimore, Md.....	Preston & Son, Green Point, L. I.
Pure Am'd Super Phosphate of Lime.....	12.35	1.80	5.25	6.50	11.75	2.16	1.11	41 82	R. W. L. Ralston & Co., Baltimore, Md.....	Preston & Son, Green Point, L. I.
Pure Dissolved Bone.....	4.85	3.25	5.65	5.16	10.84	2.10	0.73	42 20	M. W. Johnson, & Co., Atlanta, Ga.....	Chemical Co. of Canton, Baltimore Md.
Ragsdale, John C., Am'd Dis. Bone.....	12.30	2.25	6.63	2.31	8.09	2.24	0.88	31 61	Piedmont Guano Co.....	Chemical Co. of Canton, Baltimore.
Reeves, Nichol'n & Co., Cot'n Grower.....	14.37	3.40	5.69	2.31	8.09	2.24	0.88	31 61	Piedmont Guano Co.....	Chemical Co. of Canton, Baltimore.
Roanoke Guano.....	12.30	2.25	6.63	2.31	8.09	2.24	0.88	31 61	Piedmont Guano Co.....	Chemical Co. of Canton, Baltimore.
Royal Superphosphate.....	10.33	1.17	8.40	2.05	10.45	3.06	0.60	29 54	R. W. L. Ralston & Co., Baltimore, Md.....	Winfield Peters, Baltimore.
Royal Superphosphate.....	10.33	1.17	8.40	2.05	10.45	3.06	0.60	29 54	R. W. L. Ralston & Co., Baltimore, Md.....	Winfield Peters, Baltimore.
R. D. Coe's Original Bone Phosphate.....	14.52	4.61	5.60	3.40	8.40	2.04	0.75	37 14	H. M. Comer & Co., Savannah, Ga.....	Reed & Co., New York.
R. D. Coe's Am'd Bone Superphos.....	18.80	0.97	10.53	0.60	11.13	2.50	2.34	37 14	H. M. Comer & Co., Savannah, Ga.....	Reed & Co., New York.
Samana Guano.....	16.66	2.15	3.94	5.61	9.55	2.61	2.32	38 01	J. H. Inman & Co., Savannah, Ga.....	Bradley Fertilizer Co., Boston, Mass.
Sea Fowl Guano.....	9.64	4.75	7.75	1.86	9.57	2.82	2.32	38 01	J. H. Inman & Co., Savannah, Ga.....	Bradley Fertilizer Co., Boston, Mass.
Sinclair Fertilizer and Chemical.....	5.15	3.65	2.05	7.06	9.11	7.17	.....	48 33	A. Hutchinson & Co., Palmetto, Ga.....	T. M. Sinclair, Cedar Rapids, Iowa.

Snowden's Cotton Compound.....	12.95	4.84	3.93	4.56	8.40	2.56	1.62	33	03	D. B. Hull, Savannah, Ga.....	Patapasco Guano Co., Baltimore, Md.
Snowden's Sea Gull am'd Diss. Bone.....	12.95	4.84	3.93	4.56	8.40	2.56	1.62	33	03	D. B. Hull, Savannah, Ga.....	G. A. Lebig, Baltimore, Md.
South American Guano.....	14.35	3.70	2.75	5.40	8.15	2.28	0.60	29	54	H. T. Luman & Co., Atlanta, Ga.....	R. W. L. Ralstin & Co., Baltimore, Md.
Southland Guano.....	9.75	3.84	4.50	3.70	8.20	2.28	0.60	29	54	H. T. Luman & Co., Atlanta, Ga.....	Ed. Barry & Co., Anhusa, Ga.
Soluble Sea Island Guano.....	14.35	3.70	2.75	5.40	8.15	2.28	0.60	29	54	H. T. Luman & Co., Atlanta, Ga.....	R. W. L. Ralstin & Co., Baltimore, Md.
Soluble Pacific Guano.....	12.96	4.70	3.65	3.15	9.73	3.03	0.72	34	15	J. J. Sparks, Sandersville, Ga.....	Pacific Guano Co., Charleston, S. C.
Sparks' Am'd Bone Superphosphate.....	14.87	5.00	6.10	3.80	9.40	2.64	0.72	34	15	J. J. Sparks, Sandersville, Ga.....	R. J. Baker & Co., Baltimore, Md.
Star Brand Complete Cotton Manure.....	11.67	2.74	5.50	2.84	8.34	2.76	.....	30	78	West Bros., Savannah, Ga.....	Allison & Addison, Richmond, Va.
Standard Fertilizer.....	18.95	2.85	6.55	2.85	9.35	2.00	.....	33	14	Stand'd Fertilizing Co., Duxberry, Mass.	Stand'd Fertilizing Co., Duxberry, Mass.
Standard Superphosphate.....	19.77	2.87	6.25	1.75	8.00	2.40	0.97	39	24	H. T. Luman & Co., Atlanta, Ga.....	Stern's Fert. Chem. Co., New York.
Stern's Am'd Bone Superphosphate.....	13.77	2.40	6.95	4.84	11.70	2.24	1.11	39	24	H. T. Luman & Co., Atlanta, Ga.....	Stand'd Fertilizing Co., Duxberry, Mass.
Stockbridge Guano.....	20.05	0.75	6.63	1.41	8.04	2.47	1.11	39	24	H. T. Luman & Co., Atlanta, Ga.....	Stern's Fert. Chem. Co., New York.
Stockbridge Manure.....	14.87	7.50	7.50	1.75	9.25	2.38	2.60	36	56	Jas. Martin, Savannah, Ga.....	W. H. Bowker, Boston, Mass.
Watson Fertilizer.....	9.43	4.54	6.53	1.48	8.01	2.31	2.70	32	66	I. B. Thompson, Conyers, Ga.....	Wando Phosphate Co., Charleston, S. C.
Watson & Clark's Superphos. of Lime.....	13.74	3.29	5.52	5.52	9.34	2.08	.....	30	84	West Bros., Savannah, Ga.....	New Jersey Chemical Co., Phila., Pa.
Wilcox, Gibbs & Co., Manipulated Guano, average of eight inspections.....	14.19	1.67	7.86	1.78	9.58	2.80	1.93	37	12	Wilcox, Gibbs & Co., Savannah, Ga.....	Wilcox, Gibbs & Co., Savannah, Ga.
Whitlock's Vegetator.....	10.22	5.20	6.80	4.10	10.40	3.18	.....	37	45	Sibley, Wheelock & Co., Augusta, Ga.....	W. Whitlock & Co., Baltimore, Md.
Wright & Co.'s Soil Guano.....	15.27	1.92	5.50	3.48	8.90	2.51	.....	31	28	A. P. Wright & Co., Thomasville, Ga.....	Read & Co., New York.
Zell's Ammoniated Bone Phosphate.....	14.66	3.85	6.55	1.63	8.18	2.10	2.76	23	43	P. Zell & Sons, Baltimore, Md.....	P. Zell & Sons, Baltimore, Md.
Zell's Economizer.....	16.05	3.40	5.35	2.98	8.83	2.04	1.21	31	35	P. Zell & Sons, Baltimore, Md.....	P. Zell & Sons, Baltimore, Md.

*These being among the first analyses made by the Chemist of the Department after his appointment, and their correctness being challenged, at the suggestion of Dr. Pratt himself, the Commissioner agreed to submit them for verification to Profs. H. C. White and C. U. Shepard, Jr. Higher results being obtained by these two chemists than by Dr. Pratt, it was deemed just that a majority should prevail. Later tests and investigations have satisfied the Commissioner that the determinations by Dr. Pratt's method are more reliable and just to all parties. They have been sustained in repeated tests by some of the most eminent chemists among whom are Profs. S. W. Johnson, of New Haven, Conn., and F. A. Genth, of the University of Pennsylvania. In justice to other manufacturers, the original analyses of these brands, as made by Dr. Pratt, are given below, together with the calculated commercial values of the same.

Baldwin & Co.'s Am'd Dis. Bone.....	16.28	2.81	8.29	0.85	9.07	1.99	1.07	31	55	Baldwin & Co., Savannah, Ga.....	Baldwin & Co., Newark, New Jersey.
Lister Bros' Crescent Bone Fertilizer.....	12.73	5.30	5.89	1.31	7.20	2.05	3.00	30	38	Baldwin & Co., Savannah, Ga.....	Lister Bros., Newark, N. J.
Merriman's Am'd Dis. Bone.....	13.71	2.51	10.14	1.68	11.22	2.48	.....	36	93	Jno. Merriman & Co., Baltimore, Md.....	Jno. Merriman & Co., Baltimore, Md.
Soluble Pacific Guano.....	12.56	2.08	6.38	2.58	8.96	2.89	.....	32	80	Adair & Bro., Atlanta, Ga.....	Pacific Guano Co., Charleston, S. C.

TABLE II.—ACID PHOSPHATES AND DISSOLVED BONES.

NAMES OF FERTILIZERS.	Phosphoric Acid.				Potash.	Relative Commercial Value.	By Whom and Where Sold, or for Whom Inspected and Analyzed.	By Whom and Where Manufactured.
	Moisture.	Insoluble.						
		Soluble.	Reverted.	Total available.				
Atlantic Acid Phosphate.....	12.10	2.95	7.55	3.25	10.80	0.79	28 28 Pelzer, Rogers & Co., Charleston, S. C.	Atlantic Phos. Co., Charleston, S. C.
Bates Acid.....	11.80	3.62	7.19	2.88	10.02	0.84	26 39 J. A. Bale, Rome, Ga.	J. A. Bale, Rome, Ga.
Barry's Biphos. of Lime Compound.....	14.02	2.73	7.50	4.10	11.60	2.36	32 77 Ed. Barry & Co., Augusta, Ga.	Ed. Barry & Co., Augusta, Ga.
Barry's Acid Phosphate.....	12.63	2.68	7.80	3.62	11.42	1.11	30 33 Ed. Barry & Co., Augusta, Ga.	Ed. Barry & Co., Augusta, Ga.
Burgess Dissolved S. C. Phosphate.....	12.60	4.39	8.80	3.50	12.30	3.07	30 75 B. J. Burgess, Athens, Ga.	E. B. Burgess & Son, Burgess Store, Va.
Chas. D. Coe's Am. B. S. Phosphate.....	17.55	3.75	8.00	2.94	10.94	1.47	36 36 W. J. Hauser, Wadley, Ga.	C. D. Coe, Linden, N. J.
Cotton Plant Dissolved Bone.....	14.20	2.42	11.24	3.03	14.32	1.85	35 80 H. C. Harris, Fort Valley, Ga.	Etiwan Phos. Co., Charleston, S. C.
Cole's Compound Acid Phosphate.....	12.62	2.11	6.00	4.20	10.20	0.76	26 71 W. T. Cole, Griffin, Ga.	W. T. Cole, Charleston, S. C.
Charleston Acid Phosphate.....	12.22	3.75	9.87	2.46	12.33	0.60	31 79 Geo. W. Scott & Co., Atlanta, Ga.	Stono Phos. Co., Charleston, S. C.
Davidson & Co., Acid Phosphate.....	11.25	4.75	9.50	2.90	12.40	0.31	00 M. W. Johnson & Co., Atlanta, Ga.	Wm. Davidson & Co., Baltimore, Md.
DeLeon's Dissolved Bone.....	12.63	6.70	7.15	3.26	10.41	0.60	28 59 Perry M. DeLeon, Savannah, Ga.	Atlantic Phos. Co., Charleston, S. C.
Diamond Acid Phosphate.....	13.05	2.58	7.50	5.22	12.72	0.98	33 36 Pelzer, Rogers & Co., Charleston, S. C.	Atlantic Phos. Co., Charleston, S. C.
Diamond Soluble Bone.....	8.02	5.30	8.25	4.14	12.35	.....	30 97 Walton, Whann & Co., Atlanta, Ga.	Walton, Whann & Co., Wilmington, Del.
Dissolved Bone Phosphate.....	8.60	2.15	8.19	5.73	13.92	.....	34 80 M. A. Stovall, Augusta, Ga.	Geo. Chemical Works, Augusta, Ga.
Dissolved Bone and Potash.....	4.22	2.40	9.45	3.72	13.17	2.28	57 M. A. Stovall, Augusta, Ga.	Geo. Chemical Co. Works, Augusta, Ga.
Dunbar & Co.'s Chemicals.....	15.52	2.20	9.25	3.70	12.95	1.79	35 24 W. M. Dunbar & Co., Augusta, Ga.	Dunbar & Co., Charleston, S. C.
Eagle Acid Phosphate.....	13.05	2.58	7.50	5.22	12.72	0.95	33 36 Pelzer, Rogers & Co., Charleston, S. C.	Atlantic Phos. Co., Charleston, S. C.
Etiwan Dissolved Bone.....	13.59	2.20	11.87	1.47	13.35	.....	33 37 C. A. Chisholm, Charleston, S. C.	Etiwan Phos. Co., Charleston, S. C.
Etiwan Potash Compound.....	10.46	3.38	10.42	3.88	14.32	1.83	82 C. A. Chisholm, Charleston, S. C.	Etiwan Phos. Co., Charleston, S. C.
Etiwan Acid Phosphate.....	12.65	6.70	7.15	3.28	10.41	0.60	28 99 Robertson T. & Co., Charleston, S. C.	Atlantic Phos. Co., Charleston, S. C.
Fertilizing Compound.....	11.60	6.33	5.58	4.43	10.06	1.60	27 71 Chemical Co., of Canton, Baltimore, Md.	Chemical Co. of Canton, Baltimore.
Georgia Dissolved Bone.....	12.65	0.95	10.35	1.80	12.15	0.76	31 59 Chas. C. Hardwick, Savannah, Ga.	Freestone Fert. Co., New York.
Georgia Grange Dissolved Bone.....	12.11	1.74	13.55	2.15	15.72	.....	39 33 Baldwin & Co., Savannah, Ga.	Baldwin & Co., Passaic river, N. J.
Georgia S. G. Acid Phosphate.....	13.47	3.81	9.07	3.47	12.54	.....	35 35 Baldwin & Co., Savannah, Ga.	Baldwin & Co., Passaic river, N. J.
Georgia Chemical Works Acid Phos.....	11.63	3.00	9.77	3.97	13.75	0.72	35 53 M. A. Stovall, Augusta, Ga.	Geo. Chemical Works, Augusta, Ga.
Long's Prep. Chemicals.....	15.89	3.32	10.88	1.36	12.24	0.53	31 45 Horn & McGhee, Rome, Ga.	John E. Long & Co., Baltimore, Md.
L. & B. Acid Phosphate.....	10.90	5.50	6.55	3.50	10.05	.....	25 12 Lorentz & Rittler, Atlanta, Ga.	Lorentz & Rittler, Baltimore, Md.
Merrymans Acid Phosphate.....	11.23	3.46	12.72	0.65	13.37	0.53	35 33 Reeves, Nicholson & Co., Athens, Ga.	John Merryman & Co., Athens, Ga.
Navassa Acid Phosphate.....	12.65	3.60	2.59	9.40	11.92	1.25	31 80 Navassa G. Co., Wilmington, N. C.	Nevassa G. Co., Wilmington, N. C.
Ober's Dissolved Bone, S. C.....	11.55	3.85	10.15	1.55	11.73	.....	29 32 G. Ober & Sons, Baltimore, Md.	G. Ober & Sons, Baltimore, Md.
Our Acid Phosphate.....	13.15	6.80	5.70	5.69	11.39	.....	47 J. M. Johnston & Co., Macon, Ga.	Atlantic & Va. F. Co., Orient, Long Id.
Pacific G. Co. Compound Acid Phos.....	13.15	3.21	10.80	3.20	13.90	.....	34 97 A. F. Crowell, Charleston, S. C.	Pac. Ga. Co., Charleston, S. C.
Palmetto Acid Phosphate.....	13.05	2.56	7.50	5.22	12.72	0.98	33 36 Robertson, T. & Co., Charleston, S. C.	Robertson, T. & Co., Charleston, S. C.
Palapasco Acid Phosphate.....	12.97	5.70	4.35	6.79	11.14	1.23	29 81 Palapasco Gu. Co., Baltimore, Md.	Palapasco G. Co., Baltimore, Maryland.
Pioneer Acid Phosphate.....	11.00	1.75	10.32	0.77	11.09	2.25	31 33 H. Atkins & Co., Gainesville, Ga.	Stono Phos. Co., Charleston, S. C.

Planter's Acid Phosphate.....	5.92	3.20	10.75	4.91	15.66	1.19	41	05	M. A. Stovall, Augusta, Ga.....	Georgia Chemical Works, Augusta, Ga.
Pomona Acid Phosphate.....	14.00	2.97	6.40	3.68	10.08	1.06	26	00	Coleman & Newsome, Macon, Ga.....	Perry M. DeLeon, New York.
Preston & Son's Acid Phosphate.....	11.40	0.00	9.00	2.60	11.00	2.90	00	Z. N. Sih, Forsyth, Ga.....	Preston & Son, Greenpoint, L. I.	
Pride of Lancaster.....	5.75	2.80	10.50	3.50	14.00	2.02	88	23	M. A. Stovall, Augusta, Ga.....	Georgia Chemical Works, Augusta, Ga.
Robson's Acid Phosphate.....	5.65	3.38	10.25	3.50	12.75	2.80	85	55	M. A. Stovall, Augusta, Ga.....	Ga. Chemical Works, Augusta, Ga.
Russell Coe's Acid Phosphate.....	15.82	0.00	9.60	3.10	12.10	1.47	35	60	J. Henly Smith, Atlanta, Ga.....	Russell Coe, Linden, N. J.
Slingluff's Pure Dissolved Bone.....	12.62	2.10	11.20	4.60	15.80	2.07	39	50	Ketchum & Co., Savannah, Ga.....	Boyle, Conner & Co., New York.
Soluble Bone Phosphate.....	7.23	.....	9.90	2.81	12.71	2.07	35	09	T. B. Thompson, Conyers, Ga.....	Wando Phos. Co., Charleston, S. C.
Wando Acid Phosphate.....	13.21	0.80	8.80	4.17	12.37	2.27	36	06	G. E. Gibbon, Charleston, S. C.....	Atlantic Phos. Co., Charleston, S. C.
Walton, Whann & Co.'s Acid Phos.....	11.25	3.75	6.95	3.05	10.00	0.84	26	34	Walton, Whann & Co., Savannah, Ga.....	Georgia Chemical Works, Augusta, Ga.
York's Favorite.....	6.60	8.50	10.45	3.35	13.80	2.14	87	92	M. A. Stovall, Augusta, Ga.....	Georgia Chemical Works, Augusta, Ga.
Zell's Cotton Acid Phosphate.....	12.90	4.35	7.00	3.56	10.55	0.93	27	89	P. Zell & Son, Baltimore, Md.....	P. Zell & Son, Baltimore, Md.

TABLE III.—Chemicals and Compounds other than Ammoniated Superphosphates and Acid Phosphates or Dissolved Bones.

NAME OF FERTILIZERS.	Phosphoric Acid.					Potash.	Relative Commercial Value per Ton.	By Whom and Where Sold, or for Whom Inspected and Analyzed.	By Whom and Where Manufactured.
	Mixture.	Insoluble.	Soluble.	Precipitated.	Available.				
Burgess' Potash.....	7.40	22.80	.....	.....	.....	12.68	\$20 29	E. B. Burgess & Son, Burgess Store, Va.	E. B. Burgess & Son, Burgess Store, Va.
Bone Meal, Pure.....	7.60	13.00	1.65	0.15	1.80	.....	15 95	M. W. Johnson & Co., Atlanta, Ga.....	Wm. Davidson & Co., Baltimore, Md.
Dixie Am'd Phosphate.....	10.18	.....	0.25	2.99	3.24	.....	8 24	Alex. Conacher, Augusta, Ga.....	Dixie Fertilizer Co., Augusta, Ga.
Dixie Phosphate.....	16.97	22.55	0.25	2.47	8.72	.....	8 10	Alex. Conacher, Augusta, Ga.....	Dixie Fertilizer Co., Augusta, Ga.
Johnson's Chemicals.....	12.45	2.73	1.00	7.74	8.95	.....	24 58	Baldwin & Co., Savannah, Ga.....	Baldwin & Co., Newark, N. J.
*Popkin's Silicated Phosphate.....	12.45	2.73	1.00	7.74	8.95	.....	30 05	George J. Popplein.....	Popplein Silicate Co., Baltimore, Md.
Raw Bone Meal.....	7.13	6.00	0.15	8.74	8.25	.....	35 82	M. W. Johnson & Co., Atlanta, Ga.....	Geo. E. Curry, Louisville, Ky.
Raw Bone Meal.....	8.80	5.45	1.70	8.63	10.38	.....	42 45	M. W. Johnson & Co., Atlanta, Ga.....	Wm. Skewne, Louisville, Ky.
Stono Phosphate Co. Ash Element.....	5.65	8.85	4.3	3.82	4.02	.....	3 74	16 66 Stono Phosphate Co., Charleston, S. C.....	Stono Phosphate Co., Charleston, S. C.
Vulcanite Guano.....	1.25	14.68	.40	4.62	5.02	.....	15 57	H. F. Grant, Savannah, Ga.....	Vulcanite Guano Co., Baltimore, Md.

*Soluble Silica, 16.13.

TABLE IV.—List of Brands whose Analyses were below the Standard required by Law, and the Sale of which was therefore Forbidden.

Kentucky Cotton Fertilizer.....	10.15	2.75	1.00	5.60	6.60	0.92	\$27 04	M. W. Johnson & Co., Atlanta, Ga.....	Kentucky Fertilizing Co., Louisville, Ky.
Iowa Superphosphate of Lime.....	20.15	1.55	4.10	1.14	5.24	0.96	1 74	19 34 Dunn, Ogletree & Co., Atlanta, Ga.....	Manhattan Fertilizing Co., New York.
Natural Guano.....	16.13	4.20	2.90	4.47	7.37	0.51	0.88	2 78 C. W. Anderson, Savannah, Ga.....	Zell & Burton, Baltimore, Md.

REMARKS.

The foregoing analyses were made by Dr. N. A. Pratt, Analytical Chemist of the Department, whose general report appears on page 10.

During the season of 1879-80 there were 119,583.06 tons of commercial fertilizers inspected and analyzed for the Georgia market, all of which, with the exception of 40 tons, being admitted to sale. The following table shows the amount inspected by each inspector:

O. T. Rogers, Inspector at Savannah.....	35,376.70 tons.
W. P. Harden, Inspector at Augusta.....	33,180.78 "
J. S. Lawton, Inspector at Atlanta.....	17,243.06 "
Troup Butler, Inspector at Brunswick.....	22,823.82 "
E. L. Thomas, Inspector at Macon.....	6,219.30 "
G. W. Rosette, Inspector at Columbus.....	4,739.40 "
Total.....	119,583.06 tons.

Although distinct inspections were made and samples drawn of each brand, a considerable number are duplicates, differing only in name, being actually taken from the same bulk, and branded according to the fancy of dealers. A number of manufacturers have no proprietary brands, and do not sell, directly or through agents, to farmers, but to nominal manufacturers, who sell them under their own brands. One large manufacturer sells one fertilizer under no less than twelve different names.

The following table shows the number of distinct inspections made by each inspector for the season, the average number of tons in each inspection, the whole number of inspections made, and the average of each:

	Number of Inspections.	Average Am't of each Inspection.
O. T. Rogers.....	261	135 tons.
W. P. Harden.....	142	233 "
J. S. Lawton.....	151	114 "
T. Butler.....	193	118 "
E. L. Thomas.....	43	144 "
G. W. Rosette.....	60	79 "
Total.....	850	140 tons.

CONDEMNED FERTILIZERS.

Of the above amount, 40 tons, comprising three brands, were shown by analysis, to contain less than the minimum percentages of ammonia and phosphoric acid required by law, and the sale thereof was accordingly forbidden by the Commissioner of Agriculture, in pursuance to section 2d of the act of 1877, from which the following is an extract:

"It shall be the duty of the Commissioner of Agriculture to forbid the sale of any Acid Phosphate or Dissolved Bone, which is shown by official analysis to contain less than ten per centum of available Phosphoric Acid; and also to forbid the sale of any Ammoniated Super-Phosphate, which is shown by official analysis to contain less than eight per centum of available Phosphoric Acid and two per

centum of Ammonia. A copy of the official analysis of any fertilizer or chemical, under seal of the Department of Agriculture, shall be admissible as evidence, in any of the courts in the State, in the trial of any issue involving the merits of said fertilizer."

The analyses of these forbidden brands, with the names of persons for whom they were inspected, and of the manufacturers, appear in Table IV.

At the time of making application for an inspection, and "in consideration of being allowed to proceed to sell and distribute the same before the official analysis thereof is made," the dealer or applicant is required to give a written obligation whereby he agrees and binds himself "to cancel and make null and void all sales that may be made thereof, and forfeit all right to compensation therefor, if, after the official analysis is made, the Commissioner of Agriculture shall prohibit its sale in accordance with law."

These written obligations, in every case, are on file in the office of the Commissioner.

COMPARATIVE TRADE IN FERTILIZERS.

The following table shows the number of tons inspected for each of the last five seasons:

There were inspected for the season of 1875-6.....	55,316 tons.
There were inspected for the season of 1876-7.....	75,824 tons.
There were inspected for the season of 1877-8.....	93,478 tons.
There were inspected for the season of 1878-9.....	85,049 tons.
There were inspected for the season of 1879-80.....	119,583 tons

AMMONIATED AND NON-AMMONIATED FERTILIZERS OR ACID PHOSPHATES.

Of the whole amount of fertilizers placed upon the market during the past season 104,838 tons were *Ammoniated Superphosphates*, and 13,906 tons were *Acid Phosphates* or *Dissolved Bones*. It is well to remark that those brands, which contain not less than eight per cent. of available phosphoric acid and two per cent. of ammonia, are classed as *Ammoniated Superphosphates*; and those containing less than two per cent. of Ammonia, and not less than ten per cent. of available phosphoric acid, are classed as *Acid Phosphates* or *Dissolved Bones*. This classification is made without regard to the name of the brand, as will be seen by reference to the tables. Those fertilizing materials which do not claim to be either of the foregoing, are classed as *Chemicals and Compounds other than Ammoniated Superphosphates and Dissolved Bones*. Of this class there were 839 tons inspected and analyzed, and are exhibited in Table III.

The number of tons of Acid Phosphates or Dissolved Bones used in Georgia during the past five seasons is as follows:

For the season of 1875-6.....	6,499 tons
For the season of 1876-7.....	12,842 tons
For the season of 1877-8.....	15,332 tons
For the season of 1878-9.....	10,291 tons
For the season of 1879-80.....	13,906 tons

Of the whole quantity put upon the market, the percentage of Acid Phosphates for each season is as follows:

For 1875-6.....	11.66 per cent.
For 1876-7.....	12.82 per cent.

For 1877-8.....	19.62 per cent.
For 1878-9.	12.22 per cent.
For 1879-80.....	11.63 per cent.

The following tabulated averages for the past five seasons will be found interesting, viz :

GENERAL AVERAGES OF ALL FERTILIZERS.*

	Available Phosphoric Acid.	Ammonia.	Potash.	Relative Commercial Value.
For the season of 1874-5.....	9.23	2.55	5.17	
For the season of 1875-6.....	10.94	2.53	2.49	
For the season of 1876-7.....	10.87	2.52	2.75	\$35.51
For the season of 1877-8.....	11.43	2.79	2.23	37.38
For the season of 1878-9.....	11.95	2.70	1.66	33.31
For the season of 1879-80.....	10.24	2.58	1.33	34.17

These are the *general* averages of all fertilizers, including *acid phosphates*, for the seasons named. The commercial values are all based upon the present valuations, per pound, of the valuable ingredients in fertilizers.

It is proper to remark that the averages of *Ammonia* and *Potash*, are of those brands *only* which are shown by analysis to contain these elements, and not of the whole number of brands analyzed.

AVERAGES OF AMMONIATED FERTILIZERS.

	Available Phosphoric Acid.	Ammonia.	Potash.	Relative Commercial Value.
For the season of 1874-5.....	8.73	2.84	5.31	
For the season of 1875-6.....	10.86	2.93	2.79	
For the season of 1876-7.....	10.51	2.73	2.43	\$36.82
For the season of 1877-8.....	10.83	2.79	2.25	38.36
For the season of 1878-9.....	11.52	2.70	1.64	39.76
For the season of 1879-80.....	9.53	2.59	1.35	34.78

AVERAGES OF NON-AMMONIATED FERTILIZERS.

	Available Phosphoric Acid.	Potash.	Relative Commercial Value.
Season of 1874-5.....	11.05	3.85	
Season of 1875-6.....	11.99	4.64	
Season of 1876-7.....	11.68	4.54	32.57
Season of 1877-78.....	13.10	2.16	34.51
Season of 1878-79.....	13.20	1.63	33.98
Season of 1879-80.....	12.44	1.28	32.41

*The averages of valuable ingredients for the years 1874-5 to 1878-9, inclusive, were taken from similar exhibits in Circular 67 (old series). The *average "commercial value"* given in that circular (page 11), instead of being an average of the calculated values of all the brands of each season, is found, on examination, to have been the *calculated value* of the average of all the analyses of such season. The method there employed was wrong in principle, and failed to present a just comparative view. In the exhibit presented above, the calculations have been revised and corrected; and, in addition, they are based on the same classification of fertilizers adopted in this Circular.

The average values for the seasons 1874-5, 1875-6, are not given, because the prices of elements were different.

These exhibits show an apparent reduction of the average standard of fertilizers as indicated by analysis. But this apparent reduction is probably due mainly to the difference between the method of analysis employed by the present Chemist and that used by the former Chemist. Prof. W. J. Land used what is known as the *Oxalate* process for determining reverted phosphoric acid, while Dr. Pratt uses the *Citrate* process. These are known to yield materially different results. There are probably differences in other details. Hardly any two Chemists agree in their methods; and the effect of such diversity of methods is to cause considerable dissatisfaction to persons interested in the analyses of fertilizers, and well illustrates the importance of a uniform method of analysis to be adopted and used by all Chemists.

The number of brands inspected, analyzed and placed upon the market, for each season since the organization of the Department, is as follows:

For the Season of 1874-75.....	110 brands
For the Season of 1875-76.....	101 brands
For the Season of 1876-77.....	125 brands
For the Season of 1877-78.....	127 brands
For the Season of 1878-79.....	162 brands
For the Season of 1879-80.....	182 brands

These are exclusive of chemicals and other preparations for making or composting manures at home.

The number of brands of Ammoniated and Non-Ammoniated Fertilizers for each season is as follows:

	Ammoniated	Non-Ammoniated
For the season of 1874-5.....	86	
For the season of 1875-6.....	68	33
For the season of 1876-7.....	85	40
For the season of 1877-8.....	90	37
For the season of 1878-9.....	119	43
For the season of 1879-80.....	135	47

RECEIPTS AND EXPENDITURES INCIDENT TO THE INSPECTION OF FERTILIZERS, SEASON OF 1879-80.

Fees on 119,533.06 tons inspected during the season.....	\$59,791 53
Inspectors' salaries to Sept. 1, 1880.....	\$4,871 17
Chemist's salaries to September 1, 1880.....	2,900 00
Cost of 1,279,200 Inspectors' Tags.....	2,582 00
Total expenses of Inspection.....	\$10,353 17
Leaving a net balance in the Treasury of	49,438 36

\$59,791 53—\$59,791 53

It is proper to remark, that of the salaries paid to Inspectors, the sum of \$341.79 was paid as a balance due to Inspectors at the time the present Commissioner came into his office—Sept. 23, 1879—and the sum of \$500.00 was paid to Prof. W. J. Land, Chemist of the Department, as balance due him to the date of his resignation; making, in all, \$841.79. The present Inspectors received their appointments and their salaries commenced on the 15th of October, 1879; and the Chemist, on the 12th of November, 1879.

REPORT OF THE CHEMIST.

GEORGIA STATE LABORATORY,

ATLANTA, July 20, 1880.

HON. J. T. HENDERSON, *Commissioner of Agriculture* :

DEAR SIR—Pursuant to your orders, I have the honor to present herewith a Report of Operations and work done for the Agricultural Department during the passed season, together with a few reflections suggested by the results attained.

Your Chemist received his appointment on November 12, 1879, nearly six weeks after the season had opened, and at once proceeded to put the Laboratory into fair working order. This Laboratory, originally supplied only for analysis of soils after three years' disuse, was in shockingly bad condition, and required refitting out and out before any reliable work could be attempted. Furnaces, water-pipes, sinks, balances, boilers, etc., all were overhauled and refitted, and a fresh supply of chemicals and apparatus ordered. It was the middle of December before systematic work could be commenced.

Up to this date the work done is as follows:

Fertilizer analyses—regular.....	211
Fertilizer analyses—revisions.....	66
Mineral analyses.....	4
Mineral water analyses.....	1
Total.....	276

The amount of labor involved in this work is best exhibited in this table of analysis, or separate determinations made.

ANALYSES.

Phosphoric acid—soluble.....	266
Phosphoric acid—reverted.....	266
Phosphoric acid—insoluble.....	266
Phosphoric acid—total.....	251
Potash.....	176
Ammonia.....	192
Moisture.....	277
Nitric acid.....	6
Sulphuric, silicia, acids, lime, magnesia, etc.....	47
Total determinations.....	1747

This amount of chemical work is far beyond the capacity of any one man, and I have only been able to accomplish it by reason of the labors of two, and sometimes three assistants; in covering the expense of which you have generously

assisted me. Exclusive of your assistance, I have been to an expense of about \$1,200, exclusive of rent, chemicals, etc., leaving me an income of \$800 for eight months' work.

The experience of the season induces me to say:

1. That the fertilizers offered on this market, while mostly coming up to the minimum required by law, present a wonderful variation in quality, by reason both of material used in the manufacture and the percentages of valuable ingredients contained. The acid phosphates range all along from 16.30 per cent. to 6.50 per cent. of available phosphoric acid. The guanos, from 13 per cent. to 5 per cent. of phosphoric acid, and from 7 per cent. to less than 2 per cent. of ammonia and from 3 per cent. to less than 1 per cent. of potash, and still these, each of its own class, respectively, are sold to the farmer at practically the same price.

2. In regard to the inspections, my observation shows that they have been well and carefully made. Revisions and analysis of samples of the same fertilizer, under different inspections, have given uniform results; and samples drawn by myself, from lots already inspected, have yielded results varying but slightly from those drawn by your inspector.

3. The low price of nitrate of soda, notwithstanding the Chili-Peruvian war, has induced some manufacturers to add this salt as part of their ammoniating material; and they ask that, under the law, the nitric acid contained be counted at its equivalent in ammonia (100 parts of refined nitrate of soda contains nitrogen equivalent to 20 parts of ammonia). Their claim is a just one, and worthy your consideration, even though its estimation adds 25 per cent. to the cost and labor of an analysis.

4 The question of what should be considered 'reverted' phosphoric acid, under the law, is an important one. As it has your attention, and will soon be discussed in a convention of chemists, which you have the pleasure to have succeeded in calling together, I will not refer to it here.

I have the honor to be

Very respectfully,

Your obedient servant,

N. A. PRATT.

JULY CROP REPORT.

Circular No. 10. }
NEW SERIES. }

Consolidation of the Reports of Crops, Etc., FOR THE MONTH OF JULY, 1880.

RETURNED TO THE DEPARTMENT OF AGRICULTURE AUG. 1, 1880

DEPARTMENT OF AGRICULTURE,,
ATLANTA, GA., August 9, 1880.

CORN

Is reported in the whole State at 23 per cent. below an average crop. This is mainly due to drouth at the critical period of earing. Some correspondents farming in the dry localities report partial exemption from injury by drouth, as the result of *deep and thorough preparation, and rapid and clean culture*. This experience is of the utmost importance, and fully sustains the soundness of advice repeatedly given in the publications of this Department. Drouth is the principal obstacle to successful corn culture in Georgia, and no farmer should fail to avail himself of all practical means of preventing its injurious effects.

In the different sections the corn crop is reported as follows, compared to an average crop: In North Georgia, 86; in Middle Georgia, 75; in Southwest Georgia, 78; in East Georgia, 68, and Southeast Georgia, 77. Drouth has been the principal cause of the injury to the crop in every section. Some report good crops by planting early varieties, which mature in advance of the usual period of drouth.

COTTON

Is reported generally in the State as promising well. The weed is small in a large portion of the State, but is green, healthy and well fruited. The caterpillar is reported in most of the counties of Southwest Georgia, but not yet in sufficient numbers to cause serious apprehension for the present, but the recent rains will induce a succulent growth favorable to the rapid increase of the worms. Serious injury may, therefore, be expected before the plant reaches maturity. The crop, however, in that part of the State in which the worm is reported is well advanced, and a good crop will probably be made in spite of the worm. Farmers in whose fields they have appeared, should take immediate steps to destroy them before they become sufficiently numerous to seriously injure the crop. London purple seems to be the cheapest insecticide as yet available. It is much easier to destroy the worms while they are in small numbers than after they have multiplied. The worms now preying upon the plant, if allowed to mature and transform to the moth (aleutia), will greatly multiply the next crop of worms.

Tobacco growers are careful to destroy the first crop of worms, and also to destroy as many of the moths as possible.

Cotton growers should pursue the same course with the caterpillar and the parent moth.

It will not be sufficient for a few individual planters to do this, but there must be concerted warfare made upon the common enemy.

The condition of the crop is reported as follows in the different sections as compared with an average crop: In North Georgia, 101; in Middle Georgia, 93; in Southwest Georgia, 98; in East Georgia, 92, and in Southeast Georgia, 105. In the whole State, 97.

Injury to the crop thus far by drouth, worms or rust, is reported in North Georgia, 7; in Middle Georgia, 9; in Southwest Georgia, 8; in East Georgia, 10 (by drouth), and in Southeast Georgia, 8. Average in the State, 8.

RICE

Is reported at 94 for the State; 103 in Southeast Georgia, where the bulk of the crop is produced; 99 in Southwest Georgia; 92 in North Georgia; 86 in Middle Georgia, and 82 in East Georgia.

SUGAR CANE

Is reported for the State at 87; in Southwest Georgia, 89; in Southeast Georgia, 88, and in East Georgia, 88. While efforts are being made at the North to produce sugar from beets, sorghum and corn, the true sugar plant is not receiving the attention at the South which its importance justifies.

SORGHUM

Is reported for the State at 83; in North Georgia, 86; in Middle Georgia, 84; in Southwest Georgia, 75; in East Georgia, 78, and in Southeast Georgia, 100. Its cultivation is not receiving the attention that was formerly given it.

FIELD PEAS

Are reported for the State at 80; in North Georgia they are reported at 87; in Middle Georgia at 80; Southwest Georgia, 82; East Georgia, 66, and in Southeast Georgia, 69. In the sections in which the drouth has prevailed, farmers complain that they have not been able to plant the usual area in this crop. Many have been prevented from sowing peas on small grain stubble for manurial purposes, or for supplementing the short supply of forage.

SWEET POTATOES.

The average condition of this crop in the State is reported at 94; in North Georgia it is 94; in Middle Georgia, 97; in Southwest Georgia, 93; in East Georgia, 88, and in Southeast Georgia, 93. The area devoted to this important crop has been somewhat reduced by the difficulty in securing plants, and the want of suitable seasons for planting, in those localities in which protracted drouth has prevailed.

PORK PROSPECT.

The prospect for *pork hogs* for next winter, compared with last year, is for the State, 94; for North Georgia, 95; Middle Georgia, 94; Southwest Georgia, 94; East Georgia, 88, and Southeast Georgia, 94. Some correspondents complain that the grain crop has been so short that difficulty will be experienced in fattening

the hogs on their farms. In some localities the drouth has been of such long continuance, that supplementary crops, such as peas and sweet potatoes, could not be planted.

GENERAL OUTLOOK

The prospect at present is that a short provision supply and a large cotton crop will be made in the State. There is evidence of a disposition to sow rust proof oats this fall to supplement the short crop of corn. The disaster to the oat crop caused by rust on all except the rust proof varieties, will have the effect of inducing more than usual care in the selection of seed for the next crop. An effort is made by the publication in the crop reports of the Department, of the address of farmers having genuine rust proof varieties for sale, to encourage a careful selection of seed. The object of the publication of the names of farmers having pure seed for sale, is to afford to those desiring them information which will enable them to secure seed at first cost and directly from producers.

To the credit of Georgia farmers be it said, a spirit of progress and enterprise is abroad among them, which must result in their prosperity and that of the whole Commonwealth. In no State in the Union are farmers more earnestly studying the interests of their industry and in none are they progressing more rapidly. Improved implements and improved stock are being introduced, and improved methods of farming adopted. More attention is being given to the improvement and selection of agricultural seeds. Waste lands are being improved and swamps drained. A careful study of the agricultural interests of the State gives the gratifying assurance of progress and thrift.

FISH CULTURE.

Is attracting more attention than ever before and it is being conducted with more intelligence than formerly. The surprising success of those to whom the German carp were distributed last fall has given an impulse to this important industry which must result in an important addition to the food supply of the State. Specimens of these fish that were only three inches long when sent out from this Department last November are now more than twelve inches long. They seem peculiarly adapted to pond culture in our climate—where they do not hibernate as in colder climates, but feed and grow throughout the year. An additional supply will be secured and distributed by the Department, next fall, to those who have ponds suitable for their reception. Those who would make fish culture in ponds, successful, *must determine to feed them*. The carp is less costly than other varieties of pond fish, because they feed upon vegetable food.

Very respectfully,

J. T. HENDERSON,
Commissioner of Agriculture

NOTES FROM CORRESPONDENTS

NORTH GEORGIA.

BANKS COUNTY.—Suffering for rain—cotton commenced to shed forms; unless it rains soon, will lose much fruit and open prematurely—some parts of the county have had partial showers but no general rain since 1st of June.

CHEROKEE.—Dry in neighborhood of Woodstock for six weeks; some showers in other portions of the county.

COBB.—Cotton small but well fruited, and two weeks earlier than last year corn not more than two-thirds of a crop—needing rain.

DADE.—Too much rain for cotton.

FLOYD.—There is great necessity for reducing the area of cotton and increasing that of grain and grass. Owing to the press of work there has been but a small crop of field peas planted or sowed. There have been some good rains in parts of the county during July, but many sections have not had a full season. Cotton is fruiting very well.

FORSYTH.—Some localities have suffered for rain, and at this date (30th July) it is generally needed. Land sowed in peas and the vines turned under, and clover fallow, made the best yield of wheat.

GORDON.—Some portions of the county have had fine rains, others very dry.

GWINNETT.—Many farmers have decided to sow none but rust proof oats next year. Personal inspection and extensive inquiries, from all parts of the county, make my estimates at 15 per cent less for corn and 11 per cent less for cotton. With a favorable August we may reach an average number of bales, in this county, from the increased acreage planted. Land should not be cultivated the first year after breaking with a two horse plow, except to sow in peas or wheat. I break all my land with a two-horse plow, and cultivate only one year at a time. I then sow in peas and let it rest. My ground is always loose. I have pasture for my cattle, never let them go out in the woods. Some of my neighbor's cattle are prowling around with head chained to foot and are troublesome. O, how long until we can have a stock law? I could carry this neighborhood in favor of it now.

HALL.—Crops generally in good condition; cotton very small on account of drought; corn cannot make half a crop unless it rains soon (Flowery Branch), suffering for rain in the lower end of the county; in the upper end, crops were never better. The drought has continued for over eight weeks in part of the county, and not over half a crop is expected. On the Chattahoochee. Little River, Wahoo, and other streams north of us the crops are better than for fifty years past. A few farmers have adopted deep plowing with much benefit. If land is subsoiled twenty-four to thirty inches, no ordinary drought would affect the crop.

HART.—Rains have been partial; some settlements have suffered. Upland corn in places will make from a fourth to a half crop. The low lands are promising. In Franklin county, for some thirty miles from this place (Parker's Store), the drought is worse than in Hart.

MADISON.—Drought has ruined crops in this neighborhood. Our last season was too long ago to recollect (Danielsville). A small area around Dowdy was seasonable to 13th July; most of the county has been suffering for rain since last of May. Crops are now losing rapidly (Dowdy).

MILTON.—Seven or eight weeks drought in portions of the county; in other places rains, or partial showers; no general season since the spring rains ceased.

MURRAY.—Rains very partial; good seasons in some localities, others extremely dry. Cotton well fruited, but drought has checked the growth of weeds.

WALKER.—Dry summers should teach us that to succeed in growing corn, we *must plow deeper before planting, cultivate more thoroughly and give it good distance.* There is far more loss every season from too thick planting than from drouth.

MIDDLE GEORGIA.

BALDWIN.—Cotton prospect very fine; corn and pea crops injured by dry weather in June and July but will make three-fourths crop.

CAMPBELL.—The south-eastern part of the county has suffered from drouth; have not had a "season" since the last of May, cutting off the crop 50 per cent.—Three-fourths of the county have a good crop. In one section of the county hogs have died with the cholera.

CARROLL.—Cotton prospects very fine. It is heavily loaded with bolls. Some will be on the market by August 15th.

COLUMBIA.—Cotton is very large, well fruited, green, vigorous and doing well, and without some unforeseen mishap in August the crop will be a large one.

DE KALB.—Crops in a portion of the county have been somewhat injured by drouth, but cotton is now promising well. A correspondent says: "My turn-plow of 3-mule power has undeceived my neighbors who presumed my cotton and all other products would fail therefrom, and has taught *me* that cereals of the first succeeding crop would be injured (this on old red hills)."

DOUGLAS. Corn somewhat injured by drouth; cotton prospect good August 1st, but beginning to suffer.

HARRIS.—"Cotton never better, corn not so good; all other crops fine."

"Sugar cane is a good and sure crop on good second bottom land, well manured; rice is also a good and profitable crop on bottoms. Dr. Franklin Barnes has a fine field of cotton planted on land after oats."

HEARD.—Corn crop very poor; cotton unusually promising.

LINCOLN.—Drouth and bud-worm have blighted the prospects for upland corn. Cotton is healthy but too small to make an average crop with the best of seasons.

SOUTHWEST GEORGIA.

BERRIEN.—No particularly noteworthy developments, save that deep tillage in early spring and frequent shallow culture after—keeping the grass and weeds well out of the crop during the long dry weather—has done wonders for our farming this season, as the reports show. We have fallen short of a supply of rain since March. We are astonished when we look at our crops.

BROOKS.—Caterpillars have made their appearance in different localities but a yet have done no harm, but the weather is and has been for ten days favorable for their rapid development, and no doubt they will injure cotton materially in the immediate future.

Too much rain in the last five days for cotton.

DECATUR.—Caterpillars have appeared in small numbers—no damage done yet—don't think they will eat off the cotton before September 1. Cotton is two weeks earlier than usual. *London Purple* will be used to destroy the worms. Wherever the cotton has received its first and second plowings with scooters and shovels, it has done remarkably well.

CRAWFORD.—Some sections still suffering for rain. Within the last five days rust has developed to an alarming extent, and unless it stops, it now seems that on light lands picking will be completed in September.

DOOLY.—Dooly will barely make corn enough—cotton has not looked so well in several years. During June scarcely any rain fell, but we had plenty in July, which has caused a great improvement in corn that was not too far gone.

We think the recent heavy rains will injure cotton. The Aletia moth has made its appearance and we are apprehensive of severe injury from the worms.

DOUGHERTY.—We have suffered terribly from drouth. No general rains from May 21st to July 23d. Most of the cotton has not grown any in a month and has shedded everything but grown bolls. With good seasons we hope to make two thirds of a crop. Cane, chufas and ground peas are badly injured.

EARLY.—Our first caterpillars appeared on the 16th of July, and are now getting to be numerous.

LEE.—Caterpillars are becoming numerous in bottoms.

MACON.—The rust has made its appearance within the past week and bids fair to injure cotton materially.

The cotton crop generally is very fine. Corn will be short.

MARION.—Early planted corn small and stunted from over two months' drouth relieved by very light showers. Where planted in water furrow and well fertilized and cultivated, corn will make one-half to two-thirds of a crop.

MUSCOGEE.—Some parts of the county will not make half crop of corn—the sandy lands—but the clay lands will make a full crop.

RANDOLPH.—All the farmers who sowed Mexican rust proof have raised fine crops of oats. Col. R. E. Kennon or Cuthbert can furnish them in any quantity. We want reliable seed wheat from abroad. Where can we get it?

SUMTER.—I would suggest the sowing one-fourth of an acre per mule in oats, well fertilized. They will come in two weeks earlier than the regular crop, also plant early in the spring, an early variety of corn for bread. In this way we can splice out the short corn crop. I had corn this year ready to grind on the 10th of July.

THOMAS.—The prospect of cotton up to the 15th of July was very flattering.—Since then it has been seriously injured by excessive heat. We are now having constant rains which is causing the cotton to shed.

EAST GEORGIA.

BULLOCK.—In some portions of the county fair corn crops will be made. Many portions will not make one bushel per acre, on account of nine weeks drouth. Cotton is shedding badly.

DODGE.—Corn is much better than was once anticipated. Cotton, generally, is as good as ever known. Land was better prepared, better fertilized, and better cultivated than usual. Fertilizers all seem to be good; hence our fine cotton crop.

GLASCOCK.—There will be a greater deficiency of grain in this county than has ever existed; and I would suggest to farmers early sowings of rye and winter-grazing oats for winter and spring pastures. Oats sown in September will not rust.

JEFFERSON.—Corn, that was neglected or worked slowly, will make hardly anything.

SCREVEN.—In the middle portion of the county we did not have a rain to wet the ground from April until the middle of July.

TELFAIR.—“We have in this section a kind of corn that ripens by the 4th of July sufficiently to be used. It is a very prolific variety. I consider it an extraordinary corn.”

WILKINSON.—The first good season in this portion of the county since May 28th was on the 27th of July. Cotton has shown considerable rust or scald, and is shedding badly. [This is from near Irwinton.]

SOUTHEAST GEORGIA.

BRYAN.—“Rust is the worst enemy to cotton in this section; but it has been found, by experiment, that, by not breaking the land until late, letting the vegetation bring up as much as possible before breaking, cotton will not rust.”

RUST PROOF OATS FOR SEED.

The names of quite a number of farmers who have rust proof oats and hardy varieties of wheat for sale, were given in Circular, No. 8. (June crop report.)

An additional list, reported since the publication of that circular, is given below for the benefit of farmers who wish to purchase seed directly from the producers.

M. Travis and W. L. Cox, Jonesboro, Ga., have five hundred bushels of rust proof oats for sale.

G. W. Warren, Conyers, Ga., has fifty bushels of red rust proof oats, which rusted very little, for sale.

C. A. Sorrier, Arcola, Ga., has two hundred and fifty bushels of rust proof oats which he says are genuine, selected every second year for ten years.

Frank White, Sparta, Ga., has one hundred and fifty bushels rust proof oats for sale.

Grant D. Perry, Madison, Ga., will sell several hundred bushels of rust proof oats, of seed that he has sown for six years without rust.

Col. M. Dickerson, Island Shoals, Ga., has 1800 bushels of California Foxtail rust proof oats for sale. They will weigh 43 lbs. per bushel.

N. Patrick, Drayton, Dooly county, has two or three hundred bushels of red rust proof oats.

J. T. Palmer, Hephzibah, Georgia, has 600 bushels of what he calls “The Bancroft oats,” rust proof for sale.

Wright Brady, Americus, Georgia, has 500 bushels of pure rust proof oats for sale.

J. C. Franklin, Eudora, Jasper county, Georgia has from 500 to 800 bushels of rust proof oats for sale.

John S. Johnson Warrenton, Georgia, has pure rust proof oats for sale, quantity not stated.

A. C. Zachry, Madison, Georgia, has 2000 bushels rust proof oats for sale.

W. H. Luttrell, Waverly Hall, Harris county Georgia, has 600 bushels rust proof oats for sale.

T. J. Toland, Jonesboro, Georgia, has 100 bushels of rust proof oats for sale.

N. M. Gunn, Byron, S. W. R. R. has 100 bushels of Horn rust proof oats for sale.

DALLAS WHEAT.

James H. Camp, Rome, Georgia, has Dallas Wheat for sale.

William Sims, Lincolnton, Ga., has 50 bushels of Bill Dallas rust proof wheat for sale. William Elam of Lincolnton, also has 50 bushels of the same variety as the above for sale.

NOTE.—Those farmers and others who fail to receive the Crop Reports and Circulars of the Department regularly and promptly, will confer a favor by reporting the fact to the Commissioner, that the fault may be discovered and corrected.

TABLE I.—*Showing the comparative condition and prospect of Corn, Cotton, etc., August 1, 1880.*

NORTH GEORGIA.

COUNTY.	Condition and prospect comp'd to an average.					Prospect of pork hogs compared to last year.	Date of last good rain.	COUNTY.	Condition and prospect comp'd to an average.					Prospect of pork hogs compared to last year.	Date of last good rain.
	Corn.	Cotton.	Sugar-cane.	Field Peas.	Sweet Potatoes.				Corn.	Cotton.	Sugar-cane.	Field Peas.	Sweet Potatoes.		
Banks.....	100	88	98	90	95	101	July 10	Haralson.....	110	75	.....	90	105	100	J'ne 20
Bartow.....	110	100	.....	.....	80	.....	J'ne 6	Hart.....	98	75	.....	75	100	90	July 21
Catoosa.....	104	95	.....	100	100	75	July 21	Jackson.....	100	98	.....	100	102	100	.....
Chattooga.....	110	90	.....	75	100	100	21	Lumpkin.....	110	90	.....	100	100	50	" 15
Cherokee.....	88	75	.....	75	75	100	J'ne 30	Madison.....	93	79	.....	50	78	98	" 21
Cobb.....	90	88	.....	98	100	100	July 20	Milton.....	100	75	.....	80	75	100	" 10
Dade.....	105	108	.....	100	105	102	29	Murray.....	105	95	.....	88	90	100	" 6
Dawson.....	105	87	.....	110	94	108	" 21	Paulding.....	90	70	.....	75	90	100	J'ne 7
Fannin.....	.....	.....	.....	.....	.....	.....	.....	Pickens.....	100	90	.....	50	100	100	.....
Floyd.....	100	75	.....	75	97	97	" 26	Polk.....	102	87	.....	90	102	90	" 21
Forsyth.....	105	95	.....	100	105	110	" 15	Rabun.....	.....	.....	.....	.....	.....	.....	.....
Franklin.....	.....	.....	.....	.....	.....	.....	.....	Towns.....	.....	90	.....	.....	100	.....	.....
Gilmer.....	.....	.....	.....	.....	.....	.....	.....	Union.....	.....	80	.....	.....	100	100	.....
Gordon.....	95	70	.....	70	90	70	J'ne 1	Walker.....	100	95	.....	90	95	90	" 15
Gwinnett.....	86	65	.....	78	95	98	July 22	White.....	125	88	90	100	75	100	" 15
Hab'sham.....	105	95	.....	100	90	100	22	Whitfield.....	107	85	.....	87	90	95	May 1
Hall.....	92	95	.....	95	97	100	" 23	Average.....	101	86	94	87	94	95	.....

MIDDLE GEORGIA.

Baldwin.....	103	77	75	80	97	95	July 28	Lincoln.....	80	60	.....	70	95	80	J'ne 25
Bibb.....	75	40	70	65	80	100	May 30	McDuffie.....	110	60	95	85	105	102	" 29
Butts.....	81	85	.....	60	87	102	July 6	Meriwether.....	105	85	.....	75	100	100	.....
Campbell.....	101	93	.....	100	102	100	27	Monroe.....	95	80	100	80	80	100	.....
Carroll.....	115	85	.....	85	110	110	" 14	Morgan.....	95	60	70	100	95	100	" 23
Clarke.....	90	60	.....	55	80	100	May 21	Newton.....	90	75	.....	80	100	100	.....
Clayton.....	100	125	.....	80	50	100	July 7	Oconee.....	110	100	.....	110	100	100	Ap'l 29
Columbia.....	98	58	100	80	90	90	29	Oglethorpe.....	90	65	.....	90	85	100	July 22
Coweta.....	105	80	.....	90	105	100	" 27	Pike.....	105	86	100	85	97	100	" 29
DeKalb.....	100	90	.....	102	105	95	" 14	Putnam.....	95	65	.....	100	75	100	" 20
Douglas.....	103	81	.....	95	98	105	" 17	Rockdale.....	85	70	.....	60	90	85	" 29
Elbert.....	80	75	.....	80	90	90	J'ne 7	Spalding.....	87	85	80	100	101	95	" 29
Fayette.....	.....	.....	.....	.....	.....	.....	.....	Talbot.....	85	65	95	50	85	105	" 29
Fulton.....	110	97	.....	85	100	100	" 22	Talbot.....	97	75	.....	75	95	100	" 29
Greene.....	85	60	.....	70	80	100	.....	Troup.....	100	75	100	95	95	90	" 28
Hancock.....	82	40	70	60	75	90	.....	Upson.....	70	65	75	50	87	95	" 24
Harris.....	97	72	100	70	105	90	.....	Walton.....	70	55	.....	70	70	85	" 28
Heard.....	90	75	75	100	103	105	.....	Warren.....	102	65	100	70	95	100	" 29
Henry.....	95	97	.....	95	100	105	J'ne 21	Wilkes.....	85	75	.....	50	75	.....	.....
Jasper.....	.....	.....	.....	.....	.....	.....	.....	Average.....	93	75	88	80	97	94	.....
Jones.....	75	50	.....	.....	100	75	" 24								

SUMMARY OF WEATHER REPORTS FOR JULY, 1880.

NORTH GEORGIA.

STATIONS.	Max. Temperature.*	Min. Temperature.*	Mean Temperature.	Total Rainfall.	Last Good Season.	Days on which rain fell.
Canton.....	88.0	61.0	70.3	5.60	July 21.	3, 5, 6, 7, 14, 21, 30.
Ellerslie.....	92.0	66.0	77.1	2.75	July 15.	1, 2, 4, 6, 9, 15, 16, 22, 28.
Gainesville.....	93.0	66.0	80.0	2.80	July 29.	1, 3, 6, 15, 21, 22, 23, 29.
Leo (White county).....	92.0	67.0	78.1	2.08	July 21.	1, 6, 9, 15, 21, 23.
Mt. Airy.....	92.0	61.0	72.5	4.50	July 21.	2, 3, 10, 15, 21, 24, 29.
Rabun Gap.....	96.0	65.0	79.3	2.65	July 14.	3, 7, 14, 15.
Rome.....	91.0	70.0	80.3	3.29	July 15	2, 15, 26, 27.
Toccoa.....						
Means.....	92.0	65.1	76.8	3.31		

MIDDLE GEORGIA.

Athens.....	94.0	74.0	84.1	3.21	July 15.	2, 3, 5, 7, 12, 14, 15, 23, 28.
Atlanta.....	92.0	68.0	78.5	2.47	July 30.	3, 5, 6, 7, 13, 20, 21, 22, 30.
Carrollton.....	93.0	72.0	80.2	2.99	July 22.	3, 5, 13, 14, 15, 21, 22, 29.
LaGrange.....	97.0	72.0	81.4	4.06	July 28.	3, 5, 11, 12, 14, 21, 22, 24, 28, 30.
Macon.....	95.0	70.0	83.0	2.67	July 28.	3, 6, 10, 15, 16, 22, 23, 28.
Oxford.....	94.0	70.0	82.9	3.15	July 27.	3, 5, 7, 13, 14, 22, 27.
Thomson.....	98.0	71.0	83.1	4.05	July 29.	2, 5, 9, 10, 13, 14, 21, 22, 24, 29.
Woodbury.....						
Means.....	94.8	71.1	81.7	3.24		

SOUTHWEST GEORGIA.

Americus.....	96.0	74.0	81.5	4.65	July 27.	6, 10, 21, 23, 24, 27, 29.
Cuthbert.....	97.0	71.0	83.2	5.80	July 28.	2, 16, 21, 22, 24, 26, 28, 29, 30.
Nashville.....	93.0	75.0	82.0	3.15	July 30.	3, 9, 12, 23, 26, 28, 30.
Thomasville.....	93.0	71.0	80.1	4.55	July 30.	4, 6, 10, 12, 14, 16, 17, 21 to 31, inclusive.
Means.....	94.9	72.7	81.9	4.54		

EAST GEORGIA.

Augusta.....	92.0	72.0	81.0	4.30	July 23.	1, 5, 7, 9, 10, 11, 14, 21, 22, 23.
McRae.....	101	75.0	85.6	3.90	July 24.	5, 12, 15, 21, 23, 24, 26.
Ogeechee.....	96.0	73.0	81.0	4.85	July 29.	7, 14, 16, 22, 23, 29.
Swainsboro.....	102	74.0	85.7	4.34	July 29.	9, 12, 14, 21, 23, 29.
Means.....	97.7	73.5	83.3	4.35		

SOUTHEAST GEORGIA.

Blackshear.....	99.0	75.0	83.0	5.66	July 28.	4, 6, 7, 9, 11, 12, 17, 26, 27, 28.
Brunswick.....	96.0	71.0	82.0	4.62	July 26.	5, 6, 10, 11, 16, 17, 22, 23, 24, 26, 28, 29, 30, 31.
St. Mary's.....	95.0	74.0	82.0	3.45	July 24.	2, 5, 10, 12, 17, 18, 22, 24, 31.
Waltherville.....	97.0	07.0	81.8	6.45	July 29.	3, 5, 10, 11, 15, 16, 22, 23, 25, 26, 28, 29, 30.
Means.....	96.7	72.5	82.2	5.04		
Means for State.....	94.8	70.3	80.7	3.18		

*The maximum temperature is the highest observed temperature at 2 p. m. The minimum temperature is the lowest observed temperature at 7 a. m.

The Georgia Stock and Fair Association

will hold its Third Annual Fair, at Oglethorpe Park, Atlanta, Ga., commencing Monday, October 18, 1880, and continuing one week.

B. W. WRENN, Secretary, Atlanta, Ga.

The Ocmulgee Farmer's Club

will hold its Second Annual Fair, at the Fair Grounds and Premium Hall, Howard District, Bibb county, Georgia, August 12th and 13th, 1880.

W. D. H. JOHNSON, Secretary, Bolingbroke, Ga.

The Western Georgia Fair Association

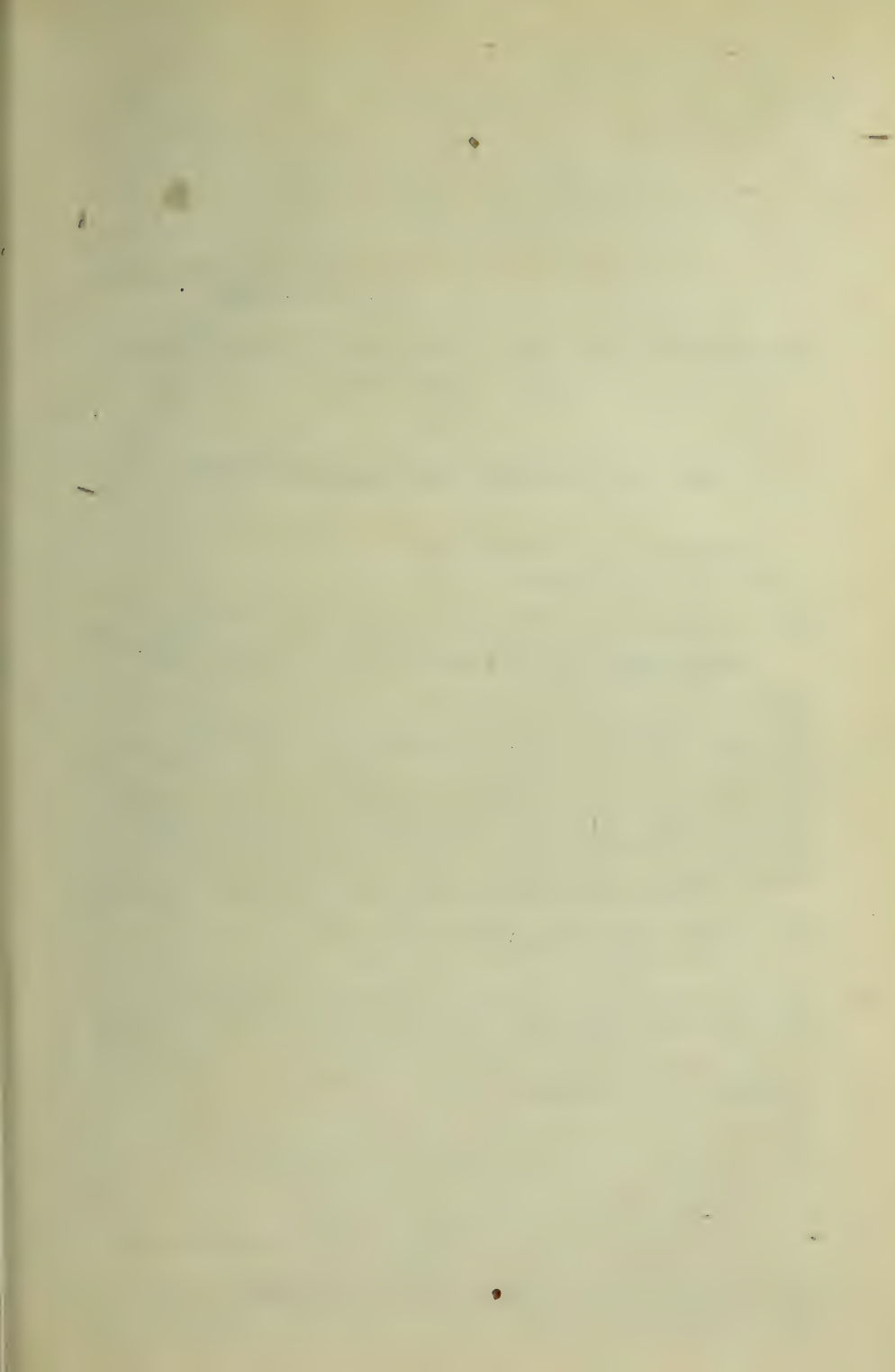
will hold its Annual Fair, at LaGrange, Ga., commencing October 26th, and continuing four days.

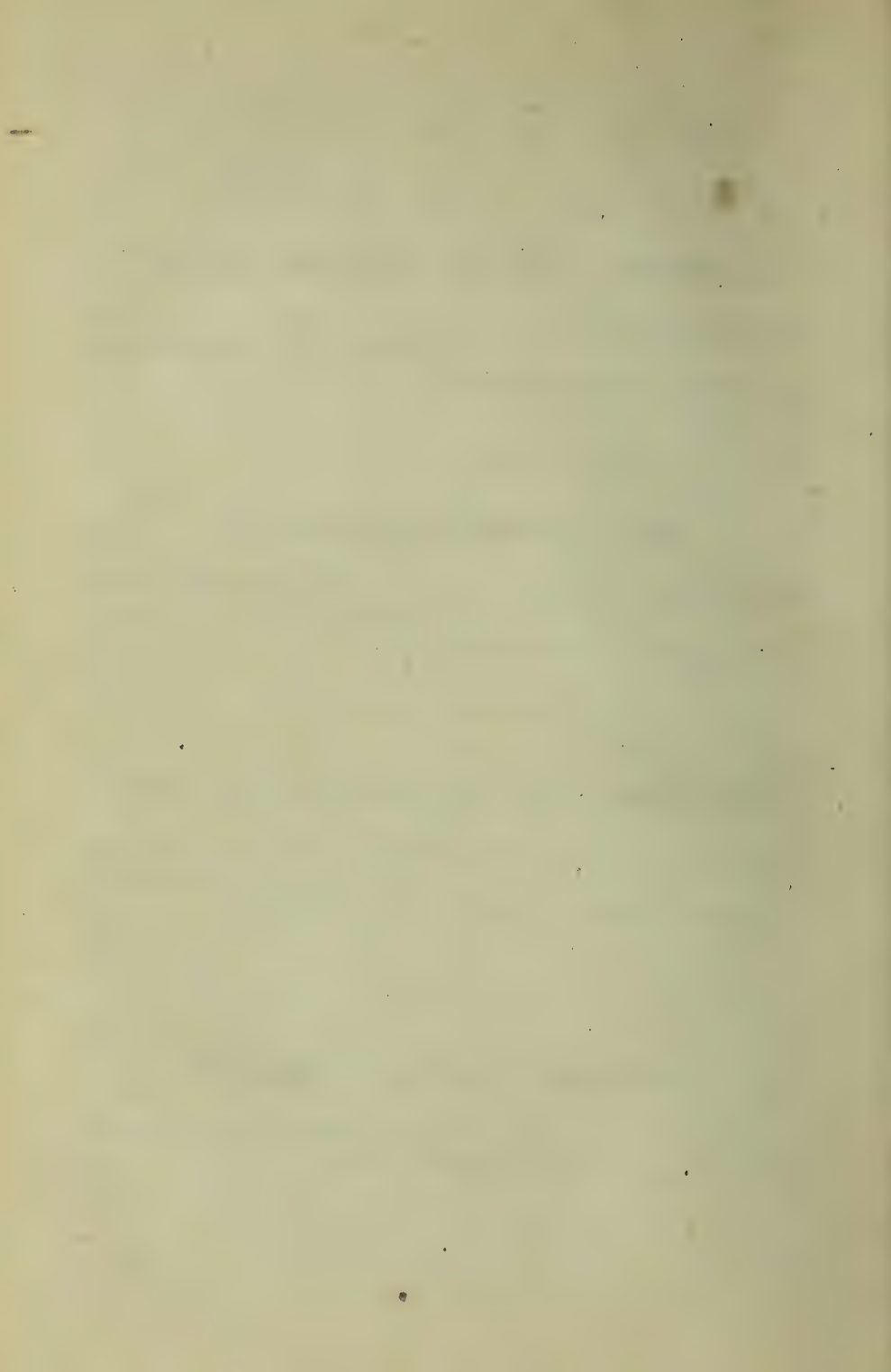
T. H. WHITAKER, Secretary, LaGrange, Ga.

The Americus Fair Association

will hold its Fair at Americus, October 26th, and continue five days.

JOHN W. WHEATLEY, Secretary, Americus, Ga.





Special Circular No. 10. }
NEW SERIES. }

REPORT OF GROWING CROPS, ETC., FOR THE MONTH OF AUGUST 1880.

RETURNABLE SEPTEMBER 1st, 1880.

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA., August 10, 1880.

DEAR SIR—Please answer the following questions **on the 1st day of September**, or a few days before, if necessary, and mail promptly, so that your report may reach this office **by the Third of September**.

Answer every question, that will permit of it, in numbers indicating per cent.

An AVERAGE CROP, or AVERAGE CONDITION, or anything with which comparison is made, is always taken as 100. Thus, if the corn crop at any time is 10 per cent. better than last year, or 10 per cent better than an average it should be reported as 110 in each case; and if ten per cent. below these standards, it should be 90. Never report "10 per cent. better" or "10 per cent. worse," but 110 or 90, as the case may be. So avoid vague comparisons, such as, "some better," "hardly so good," "above an average," etc.

In making up your answers, let them apply to the whole county in which you reside, or as far in every direction as your knowledge may extend, *not simply to your own farm.*

If a crop about which questions are asked is not grown in your county, use the character **X**. If you have not sufficient data to make an approximate estimate, leave the space blank.

Very Respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

I. For what county do you report?.....county.

II. Your name?

III. Your post-office?.....

REQUEST.—Having answered the above questions, and those on the following pages, *please fold the report as you received it* and **fill the blank on the back.**

CONDITION AND PROSPECT SEPTEMBER 1ST, COMPARED
to an average of—

- | | | |
|---|-------|-----------|
| 1. Cotton? | ..... | per cent. |
| 2. Corn? | ..... | per cent. |
| 3. Sugar cane? | ..... | per cent. |
| 4. Field Peas? | ..... | per cent. |
| 5. Sweet Potatoes? | ..... | per cent. |
| 6. Sorghum? | ..... | per cent. |
| 7. Chufas? | ..... | per cent. |
| 8. Rice, yield of, to average? | ..... | per cent. |
| 9. Turnips, acreage compared to last year? | ..... | per cent. |
| 10. Stand, compared to average? | ..... | per cent. |
| 11. What casualty has affected cotton since 1st August? | ..... |  |
| | | |
| 12. Extent of injury from this or other causes? | ..... | per cent. |

NOTE.—Correspondents wishing to communicate with the Commissioner on any subject not connected with this report, will please write the same on a separate sheet.

NOTES FROM CORRESPONDENTS.

[Under this head report any facts of general interest to farmers, or any valuable or instructive experiments, or suggestions for the benefit of farmers. The remarks should be *pointed* and as concise as possible, and written very plainly.

QUESTIONS FOR AUGUST CROP REPORTS

3

..... County.

..... Reporter.

Report made this 1880.

AUGUST CROP REPORT.

Circular No. 11. }
NEW SERIES. }

Consolidation of the Reports of Crops, Etc., FOR THE MONTH OF AUGUST, 1880.

RETURNED TO THE DEPARTMENT OF AGRICULTURE SEPT. 1, 1880.

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA., September 9, 1880.

COTTON *

Is reported for the entire State at 91.9 compared to an average. In the sections it is reported as follows: In North Georgia, 98; Middle Georgia, 92; Southwest Georgia, 87.5; East Georgia, 86.7; and Southeast Georgia, 91.5. Rust is reported on sandy lands in every section of the State, and worms generally prevalent in the counties of Southwest Georgia.

The casualties affecting the crop are rust, drouth, worms, and in some sections too much rain during August.

The estimated injury from all causes in the whole State is 12 per cent. Notwithstanding these casualties, the indications in the State point to a large yield. The plant is generally well fruited for its size, and the crop some days in advance of last year in opening. This is especially true of North Georgia, in which many correspondents report it ten days in advance of last year. As was to be expected, the general average for the State is below that of last month, but farmers generally are hopeful and in good spirits, except in some localities in which long continued drouth has shortened the crop.

The large receipts incident to the early maturity of the crop will probably have a depressing effect upon the price of the staple, since speculators will endeavor to create the impression that it indicates an unusually large crop. The recent continued rains, however, which have been general over the cotton belt, accompanied by the ravages of the boll-worm and caterpillar, and injury by rust, will seriously reduce the yield of the crop. The promise seems to be more favorable in Georgia than in any State west of her, the early maturity of the crop being due, to a large extent, to the use by her farmers of fertilizers, thus enabling them to gather the bulk of the crop before the approach of cold weather.

* In the July Crop Report Circular 10, the words Cotton and Corn were transposed in the headings of Table I. The first column should have been headed "Cotton," and the second column "Corn."

CORN.

Though still reported low—81.1 for the State—has improved since August 1st. The improvement is due mainly to the late planting, and that on bottom lands. The crop, nevertheless, will be small, and should be supplemented, as far as possible, by a liberal fall seeding of *rust-proof* oats in all of that part of the State in which it can be done without risk of winter killing. Indeed, in view of the experience of the past season, it is folly to sow any other variety on account of the risk of rust in the spring. As large an area as possible should be sown this fall, and this supplemented by January and spring sowings. The oat as a forage crop for farm stock is cheaper and better, especially in summer, than corn, under ordinary circumstances, and hence should largely take its place in the cotton belt; but the sowing of a large area is imperatively demanded by the deficiency occasioned by the partial failure of both oat and corn crop this year.

The demand created for rust-proof varieties by the experience with the last crop will increase the risk of imposition upon farmers by unscrupulous, and perhaps, misinformed dealers, anxious to supply the demand at prices commanded by the genuine rust-proof varieties. The names of farmers who have grown the genuine rust-proof varieties, which escaped rust last spring, which was a crucial test of their genuineness, have been given in the last two crop reports, to enable those who wish to purchase seed to get them pure. So far as observed, *all of the rust-proof varieties are bearded*. Farmers may protect themselves by confining their purchases to bearded varieties.

The most successful growers of oats now sow on good or well manured land from two to four bushels per acre, according to the fertility of the soil or the quantity of manure applied.

TESTS OF NEW VARIETIES OF CORN.

Farmers who received from this department last spring samples of corn for test, will please report results as soon as the crop is gathered.

Those also who are planting any other variety which has given satisfactory results will confer a favor upon the farmers of Georgia by reporting facts connected with such varieties, and by sending to this office specimens for permanent exhibition. It is very desirable to have in this office every distinct variety of corn successfully grown in the State, with the name of growers, date of planting and maturity and the yield per acre. Too little attention is given to the selection of seed corn by the farmers of Georgia. The Commissioner desires to collect the different varieties grown pure in the State for the information of those who wish to change their seed. Seed corn should be selected from the field, and this re-selected when shucked. This continued from year to year will materially improve the corn and increase its productiveness. The "Newman White Prolific" variety sent out from this department last spring, and which, so far as reported, has given generally good results, has been selected for twenty-five years, taking only top ears, from stalks with two or three ears to the stalk, with a view to increasing its prolific qualities—with what effect, those who have planted it on good soil this year can testify. Every farmer who would reap the greatest profits and highest pleasure from his occupation should carefully select each year his planting seed for every crop cultivated on his farm. In nothing is this more important than in corn, which hybridizes more readily than any other plant which we cultivate.

SUGAR CANE

Is reported ten per cent. higher than last month. The rains which have prevailed in Southern Georgia, where the cane is principally grown have stimulated its growth so that it is now reported at 93 per cent. of an average crop.

FIELD PEAS

Are reported at 87 per cent. of an average as to condition. The area devoted to them is, however, less than usual on account of the drouth which prevailed in a large portion of the State during the usual period of planting them in the corn.

SWEET POTATOES

Are reported at 98 per cent. of an average crop. As this crop continues to grow during September, the yield will depend, to a considerable extent, upon the seasonableness of this month.

SORGHUM AND CHUFAS

Are reported respectively at 90 and 96. These crops are planted to a very limited extent in the State.

RICE

Is reported in Southeast Georgia, the section principally devoted to it, at 103—three per cent. above an average crop. In Southwest Georgia, 99; East Georgia, 95; Middle Georgia, 92, and North Georgia, 98. The average for the State is 97.

TURNIPS.

The area devoted to this crop is three per cent. above an average, and the stand 89. Owing to fall drouths and insects this is a very uncertain crop.

NOTES FROM CORRESPONDENTS.

NORTH GEORGIA.

BANKS COUNTY.—Cotton seriously injured by rust—no rain since August 6th—late corn and other fall crops injured by drouth. More blast on corn than known since 1845. Cotton small but well fruited. Farmers generally picking cotton.

CHATTOOGA.—Cotton has been seriously injured within the last ten days by rust and drouth. Cotton opening earlier than at any time in the last ten years.

FLOYD.—Corn has improved since last report. Cotton has not realized expectations. Cotton opening rapidly. Rain needed now.

GORDON.—Cotton earlier than last year. Drouth in August reduced the prospect in part of the county.

HALL.—Corn has improved—will make nearly an average crop. Cotton is better than last year, in consequence of better culture. Farmers are using better implements, preparing deeply and cultivating shallow.

HART.—Upland corn injured by drouth—on bottom lands it was never better. A correspondent says: "Improved cotton seems to stand drouth better than that made from ordinary seed. This may result from a change of climate, as most of our improved or prolific seed were brought from a lower latitude; or it may result from an increase of vitality in the improved plant."

LUMPKIN.—Too much rain in the spring made a poor stand of corn in low lands. Corn has done well since the rains in July and August. "To prevent bud-worms from injuring corn, soak the seed in a solution of blue stone—tablespoonful to a peck of corn."

MILTON.—Bottom corn good—upland sorry—cause, drouth. Cotton opening earlier than usual—some are picking cotton.

POLK.—A correspondent says: "Our corn crop will be necessarily short, because—1st. The spring was too dry; 2d. Its cultivation was much neglected that more time might be devoted to cotton. The spur in the price of cotton last fall, while it gave temporary relief to farmers, will, in the end, I fear, prove a curse. The reason is obvious. In this, one of the finest corn-growing counties in North Georgia, the supply of corn will not be at all equal to the demand. This alarming deficit is caused partly by unpropitious seasons, but more by criminal neglect. Another bad feature, we have no small grain to supplement our corn crop, the former having proved an almost unprecedented failure this year. Pea prospect the poorest I have ever had in my limited experience. The first sowing of turnips nearly all killed by hot dry weather."

WHITFIELD.—In a portion of the county cotton has shed badly—in another the crop is extra fine. Picking began 26th of August, and first bale expected at Dalton between the 1st and 5th of September. Last year the first bale was received on the 18th of September.

MIDDLE GEORGIA.

BUTTS.—Rust general and spreading rapidly, causing cotton to open prematurely; farmers preparing to sow largely of fall oats.

CLARKE.—Cotton manured with ammoniated superphosphate has ceased to bloom, and has shed its forms much more than that manured with compost (stable manure, cotton seed and dissolved bone.)

COWETA.—Cotton rusting badly on light sandy soils.

DEKALB.—Cotton fifteen days earlier than last year. Bottom corn very good, upland has suffered slightly for want of rain. Much excitement on the subject of a stock law. More depredations on potato patches and fruit than usual, and more wages hands leaving the farms than ever before.

ELBERT.—Cotton picking ten days in advance of last year. A correspondent says: "The best plan I have tried to prevent worms from killing young corn on bottom lands is, as soon as the corn begins to come up, run round it as close as possible with small "rooter," following with a common garden rake, drawing the rake directly over each hill of corn; this removes all clods and exposes the roots of the corn to the warmth of the sun, driving the worm from the corn. After trying some half dozen so-called preventives, the above is by far the best that I tried."

HENRY.—A correspondent says: "Salt and land plaster put into the compost heap prevents rust in cotton and makes that plant stand three weeks or more of drouth without shedding. It also prevents corn blades from firing." Another says: "I use four hundred to six hundred pounds of good dry lot compost (scraping of cow lot thrown into the stable with cotton seed make an excellent compost), scattered along the furrow and then put in one hundred or one hundred and fifty pounds of commercial fertilizer. This I find gives me better results than anything I have tried."

JONES.—A correspondent says: "The corn, cotton, pea, potato and hay crops of this county are good. We have plenty made to live upon through another crop season if properly gathered and preserved."

LINCOLN.—Mr. Zachariah Willingham, (P. O. Lincolnton), has fifty bushels of fine Dallas wheat for sale.

MCDUFFIE.—Cotton on gray lands injured by rust, fine on red lands. Cotton picking progressing well, lint fine, labor never more efficient nor more easily controlled.

PUTNAM.—A correspondent says: "Field peas may be made to fill the place of corn for stock—can be raised on poorer land with less work. Horses will not eat peas enough in the hull to hurt themselves unless famished." [We presume our correspondent means that the vines are to be gathered with the peas so as to have fodder and corn together. This makes a very superior forage for stock, cattle or horses, but require great care in curing to prevent the leaves from shedding. To do this they must be either put into very small shocks in the field as cut, or spread in layers not over a foot in thickness under shelter. If exposed to the sun while curing they will lose their leaves.]

TALIAFERRO.—Notwithstanding favorable seasons since July 15th, cotton is not doing well, and some rust is appearing. Bottom corn fine, upland very poor.

TROUP.—Rust and worms reported on cotton. One correspondent expects one

hundred bushels corn per acre on bottom land planted very thick. Complaints of blight of apple trees.

WALTON.—Forward upland corn, poor; bottom, especially where planted late, fine. But little cotton made since July. This is opening rapidly.

WILKES.—Cotton has rusted on red land where it was never known to rust before. A portion of the county has been excessively dry. Cotton opening very rapidly.

SOUTHWEST GEORGIA.

BERRIEN.—Rust in cotton has always commenced in the poorest spots of the field. Should this not satisfy the farmer that proper fertilizers would keep cotton growing?

BROOKS.—Cotton injured by excessive rain and wind for the last three days.

One half the cotton crop is now open in the field. We never had cotton so forward.

CHATTAHOOCHEE.—Late plowing of cotton has proved very beneficial this season—especially on lands where crow-foot grass predominates. The plant has kept green, growing, and taking on fruit, and the late working has checked the tendency to rust. The late planted corn on the Chattahoochee river was never more promising. It is thought the yield will be from 50 to 100 bushels. This is on lands that were first planted in cotton. I think the Department should, by every possible means, encourage the sowing of wheat. It is true, rust is a great barrier; but a calculation for a series of years will show that there is more money in a wheat, than in a corn crop, and quite as much as in an oat crop. It is generally conceded that our lands will make twice as many bushels of oats per acre as wheat; but wheat weighs nearly twice as heavy as oats. Hence the product of an acre in wheat is worth quite as much as that of an acre in oats. [Does not our correspondent mistake in putting the average yield of wheat at half that of oats? Is not the yield of wheat, corn and oats in Southwest Georgia, more correctly represented by the proportion—wheat, 1; corn, 2; oats, 4?]

DOOLY.—Dooly will be compelled to purchase 20 per cent. of her bread supplies next year. Cotton is rusting badly, caused by heavy rain in the first part of the month, and now a drought of three weeks. It is opening fast, and if it continues so all will be open by 1st of November.

DOUGHERTY.—Caterpillars appeared in large numbers about August 20, and many fields are now stripped of all foliage, as well as young bolls and forms. Nothing left but grown bolls, and 90 per cent. of them open. Favored spots had rain, and will make good crops. Rust has destroyed cotton on gray lands—many fields being dead. Most of the crop will be gathered in September.

HOUSTON.—Last year I planted a field of tolerably thin, gray land, in cotton, applying 75 pounds of guano in the drill. The crop was promising until August, when rust set in and it made nothing but a bottom crop. This year I planted the same field in cotton, using 400 to 500 pounds per acre, of a compost composed of 5 bushels cotton seed, 50 lbs guano, and 400 lbs lot manure. The cotton has no rust, is much better than last year, and is in flourishing condition. Will double last year's yield. This seems to prove that lack of a good fertilizer is one of the principal causes of rust, and that a good compost is the cheapest and best fertilizer for cotton.

IRWIN.—Cotton injured very much by rust. Some farmers think the cause is too much rain. But I think it is caused by the exhaustion of fertilizers, as the disease is confined chiefly to poor spots of land.

LOWNDES.—Mr. Joshua Moore, of this county, cultivates a field on which cotton has rusted very badly for several years. Last year the field was sown in cow-peas, the vines turned in, and the field again planted in cotton this year, without manure, and with ordinary culture. The cotton is excellent, and entirely free from rust. On my own farm, a small plat of poor land was richly manured by throwing cotton seed on it for composting. The adjacent area manured with 200 pounds per acre of Wilcox & Gibbs' guano, rusted, while the cotton seed plat was entirely exempt.

The same result occurred on a small plat heavily manured by accidental wash of Wilcox & Gibbs' guano. These facts indicate the relation between rust and scarcity of plant-food in the soil.

MACON.—Very destructive rains (to cotton) on 3d, 4th and 5th of August, causing cotton to shed, and, in many places, rust to spread at a fearful rate. Picking is general, and some farmers have out one-half of their crops. There will be a larger area in oats than last year.

MARION.—Cotton is opening more rapidly than I ever saw it before. Where it rusted, it is nearly all open, and much of it blown out by the heavy gales of wind, and badly injured.

RANDOLPH.—The purple straw, or red May wheat, is the best for our county, but we have run out of seed. Where can we procure good, sound, ripe seed? In our opinion a good dressing of land plaster in the fall will save wheat from the fly. Try it, farmers.

Caterpillars are numerous all over the county, and the cotton crop will be short.

WORTH.—Mr. James Gregory, of this county, cleaned up three acres of cypress pond, which had a loose, loamy soil. It was so rough that he could not plow it, but chopped trenches, 18 to 24 inches apart, with an old axe, and sowed in rice. He cultivated once with hoes, and now the rice is five feet high, with heads ten inches long, and rice growers say he will be sure of 100 bushels per acre. Several others are ditching and preparing ponds, and, if successful, our heretofore waste lands will become our most profitable.

EAST GEORGIA.

BULLOCH.—The extreme heat, long-continued drouths, and then a little good season, have caused the cotton to shed all but the first fruit, which is nearly all opened and picked out. Farmers are preparing for a large oat crop.

JEFFERSON.—A very material change in the cotton crop since my last report. Rust completely stopped all growth of the plant; but the rains caused it to make a second growth which gave promise of a late crop. But, alas, for human hopes! The irrepressible worm has begun its depredations and the end can be easily seen. Our farmers will sow largely of fall oats to supplement the short corn crops. My experience is that cotton never rusts when the mercury does not go above 90° and rains are not delayed more than 10 to 20 days during July and August.

WILKINSON.—Rust has been the only serious drawback affecting the cotton crop. Altogether, the prospect was never better than it was a month ago, but since the ravages of that enemy, only an average is maintained.

SOUTHEAST GEORGIA.

CLINCH.—The Agricultural Department at Washington sent out some small packages of golden hull rice, last season, the yield of which was immense, and the sample far superior to the varieties heretofore planted.

GLYNN.—This county has planted but little cotton since the war, an unhealthy effort having been made in 1866 and '67, resulting in disaster. The long staple or Sea Island is the only kind grown, and the price then was too low to encourage the farmers to continue a doubtful crop. Not so in South Carolina. There, a persistent effort has been made to re-establish its culture, and with marked success. The attention of our Sea Island planters has been attracted monthly to the change, and, after this year, I doubt not that the culture of Sea Island will again become a profitable industry.

LIBERTY.—Field peas can be cheaply made if the land is well prepared and the seed put in with horse planters—3 feet rows, 2 to 3 pecks seed per acre. With half sweep, run close to drill and sweep out middles. *Never work them when wet with dew or rain.* Before the leaves fall, mow the vines and stack immediately around scraggy poles. An old field pine with the limbs trimmed from four to six feet long is just the thing. Four poles to the acre will answer—cut 14 feet long and buried two feet deep. As the vines shrink the limbs keep them up, allowing a free passage of air. There will not be a mildewed leaf or decayed pea. In three weeks they can be housed, or they may stand three months, if well capped. Haul in early in the morning or on a damp day. You can stack as they are cut, but it is best to cut in the morning and stack in afternoon. I have practiced this plan successfully since 1866.

TABLE I.—*Showing the comparative condition and prospect of Corn, Cotton, etc., September 1, 1880.*

NORTH GEORGIA.

COUNTY.	Condition and prospect comp'd to an average.						Rise, yield of.	COUNTY.	Condition and prospect comp'd to an average.						Rise, yield of.	
	Cotton.	Corn.	Sugar-cane.	Field Peas.	Sweet Potatoes.	Sorghum.			Chufas.	Cotton.	Corn.	Sugar-cane.	Field Peas.	Sweet Potatoes.		Sorghum.	Chufas.
Banks.....	94	87	.....	85	95	70	90	95	Haralson.....	.....	.....	.....	.....	.....	.....	.....
Barlow.....	100	100	.....	90	.....	90	.....	.....	Hart.....	75	70	.....	100	80	66	.....
Catoosa.....	.....	.....	.....	.....	.....	.....	.....	.....	Jackson.....	100	96	.....	100	102	98	.....
Chattooga.....	90	100	.....	100	100	100	.....	.....	Lumpkin.....	100	80	.....	60	100	100	.....
Cherokee.....	.....	.....	.....	.....	.....	.....	.....	.....	Madison.....	80	90	.....	90	105	80	.....
Cobb.....	100	95	.....	100	120	90	100	.....	Milton.....	75	75	.....	65	90	75	.....
Dade.....	100	101	.....	107	105	95	.....	.....	Murray.....	110	95	.....	100	102	100	.....
Dawson.....	105	87	.....	100	100	92	.....	.....	Paulding.....	90	85	.....	100	100	75	.....
Fannin.....	.....	.....	.....	.....	.....	.....	.....	.....	Pickens.....	.....	.....	.....	.....	.....	.....	.....
Floyd.....	97	85	.....	80	95	93	.....	.....	Polk.....	100	80	.....	50	100	95	.....
Forsyth.....	110	105	.....	110	110	100	.....	.....	Rabun.....	.....	.....	.....	.....	.....	.....	.....
Franklin.....	125	120	.....	100	125	110	.....	.....	Towns.....	.....	100	.....	.....	100	90	.....
Gilmer.....	.....	105	.....	100	110	100	.....	.....	Union.....	.....	75	.....	.....	100	100	.....
Gordon.....	95	78	.....	87	90	75	.....	.....	Walker.....	100	90	.....	90	100	100	.....
Gwinnett.....	110	90	.....	90	100	100	.....	.....	White.....	125	75	.....	80	90	85	.....
Habersham.....	97	95	.....	100	90	100	.....	100	Whitfield.....	110	105	.....	110	110	100	.....
Hall.....	100	87	.....	105	112	90	.....	.....	Average.....	98.0	89.0	.....	91	100	91	95 98

MIDDLE GEORGIA.

Baldwin							Lincoln	90	65		90	95	85	75
Bibo	96	50	75	100	55	90	McDuffie	101	60	105	99	90	90	110
Butts	83	85		87	95	80	Meriwether	97	77	80	102	107	100	
Campbell	97	67		87	100	50	Morroe	95	82	100	80	95		10
Carroll	115	95		100	110	100	Morgan	95	65	100	105	110	90	100
Clarke	87	55	100	100	100	100	Newton	92	90		102	112	87	
Clayton							Ocone							
Columbia	95	60	90	98	95	90	Oglethorpe	90	75		80	100	100	100
Coweta	90	77		102	105	95	Pike	100	85	100	105	100	90	75
DeKalb	100	85		97	100	75	Putnam	100	83		100	105	100	
Douglas	100	80		85	110	79	Rockdale	85	65	87	97	100	100	100
Eibert	75	75		80	93	75	Spalding	70	77	100	105	110	100	
Fayette	90	90		90	100	100	Talbot	75	75	97	60	90	80	
Fulton	100	85		60	90	30	Talbairto	80	75		85	100	100	100
Greene							Troup	95	73	95	87	90	87	
Hancock	90	58	85	75	90	85	Upton	80	75	100	80	110	50	
Harris	75	70	100	65	95	50	Walton	90	80	100	80	97	100	75
Heard	100	77		108	112	100	Warren	85	50	75	75	80	100	85
Henry	105	100		90	115	100	Wilkes	80	50		60	80		
Jasper	115	85		110	115	90	Average	92	76.5	97	89	99	87	94
Jones	100	75	00	90	97	100								92

SUMMARY OF WEATHER REPORTS FOR AUG. 1880.

NORTH GEORGIA.

STATIONS.	Max. Temperature.	Min. Temperature.	Mean Temperature.	Total Rain-fall.	Last Good Season.	Days on which rain fell.
Canton .....	.....	.....	.....	.....	.....	.....
Ellerslie .....	.....	.....	.....	.....	.....	.....
Gainesville	89.0	64.0	75.4	5.65	Aug. 27.	3, 4, 5, 6, 10, 18, 26, 27, 28, 31.
Leo (White county).....	90.0	67.0	79.2	7.07	Aug. 26.	3, 4, 5, 6, 10, 11, 17, 18, 24, 25, 26, 28, 31.
Mt. Airy	89.0	64.0	75.5	8.75	Aug. 24.	3, 4, 5, 10, 20, 23, 24, 27, 28, 31.
Rabun Gap	87.0	64.0	75.5	4.83	Aug. 26.	3, 4, 5, 10, 17, 18, 26, 27, 30.
Rome	91.0	64.0	77.7	3.75	Aug. 23.	3, 10, 12, 23.
Toccoa	90.0	67.0	76.8	7.77	Aug. 22.	1 to 5, 22, 23.
Means	89.3	65.8	76.0	6.81	.....	.....

MIDDLE GEORGIA.

Athens .....	.....	.....	.....	.....	.....	.....
Atlanta	90.0	65.0	76.4	3.22	Aug. 6.	3, 5, 6, 10, 11, 22, 24, 25, 26, 31.
Carrollton	94.0	64.0	77.8	3.80	Aug. 25.	3, 4, 5, 9, 22, 25, 31.
LaGrange	94.0	69.0	78.3	4.80	Aug. 25.	3, 4, 5, 9, 10, 23, 24, 25, 30.
Macon	95.0	68.0	80.0	6.73	Aug. 30.	3, 4, 5, 6, 8, 11, 23, 25, 26, 30, 31.
Oxford	92.0	64.1	76.8	7.00	Aug. 24.	3, 4, 5, 6, 9, 24, 25, 31.
Thomson	94.0	67.0	79.3	5.70	Aug. 27.	3, 4, 5, 6, 18, 25, 26, 27, 30.
Woodbury .....	.....	.....	.....	.....	.....	.....
Means	93.0	66.6	78.1	5.49	.....	.....

SOUTHWEST GEORGIA.

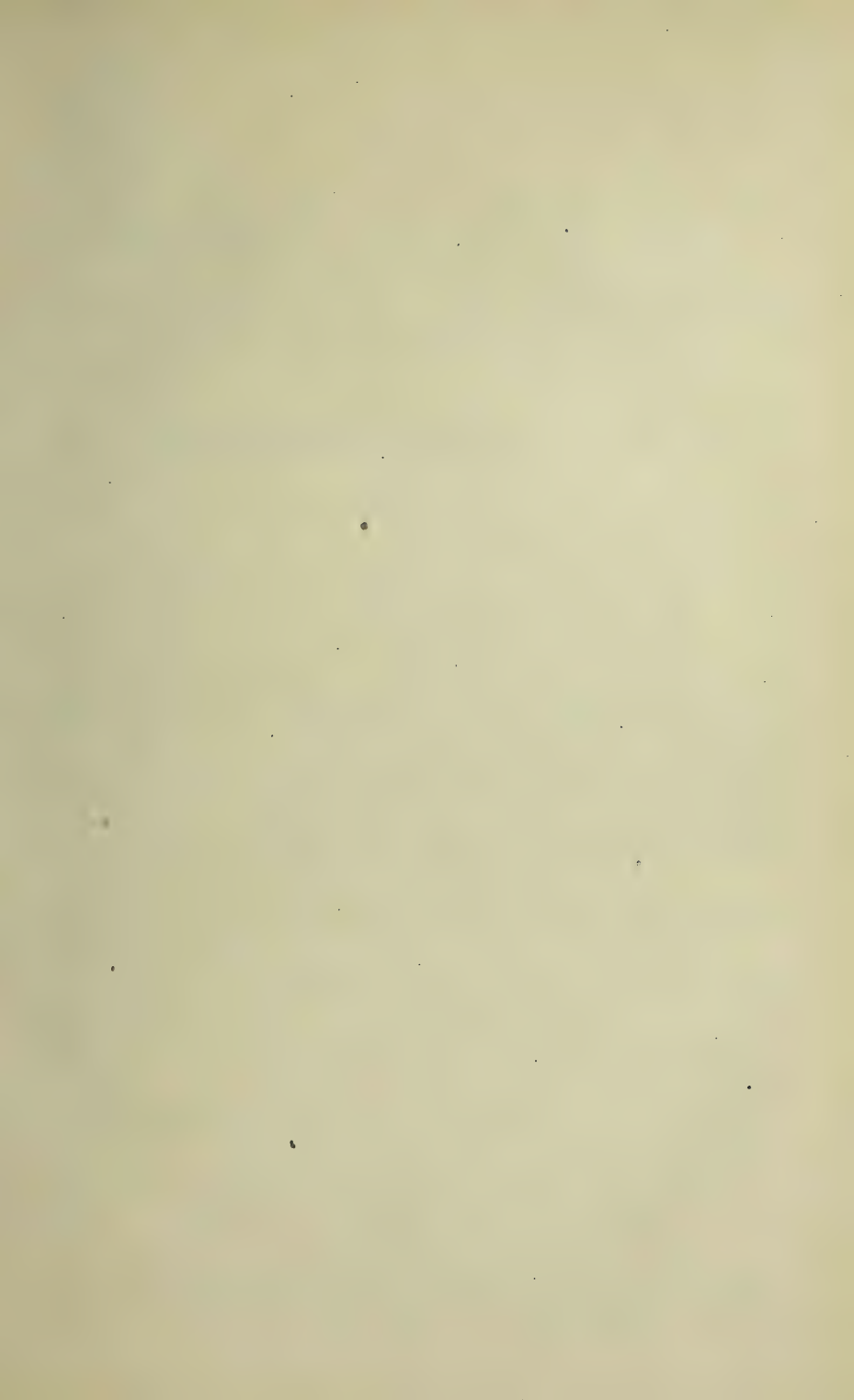
Americus	96.0	72.0	80.6	8.05	Aug. 30.	3, 4, 5, 6, 8, 9, 10, 11, 20, 30, 31.
Cuthbert	96.0	71.0	81.4	6.35	Aug. 30.	3, 4, 5, 6, 8, 12, 26, 30, 31.
Nashville .....	.....	.....	.....	.....	.....	.....
Thomasville	95.5	73.0	79.7	12.73	Aug. 31.	3, 4, 6, 7, 8, 9, 11, 18, 24, 25, 26, 27, 29, 30, 31
Means	95.7	72.0	80.5	9.04	.....	.....

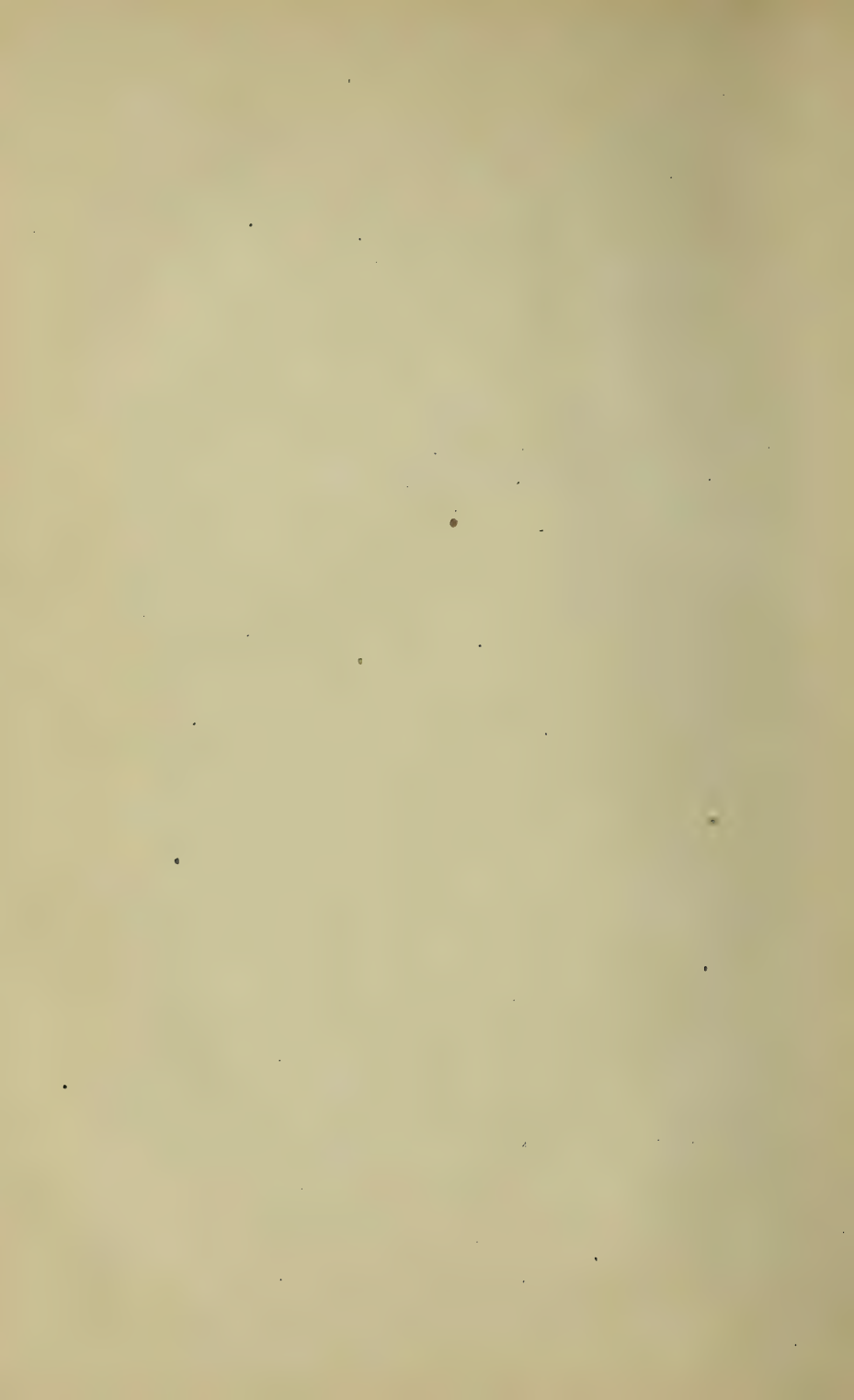
EAST GEORGIA.

Augusta	91.0	69.0	78.6	4.60	Aug. 31.	4, 5, 6, 10, 25, 26, 27, 30, 31.
McRae .....	.....	.....	.....	.....	.....	.....
Ogeechee	94.0	73.0	81.5	4.40	Aug. 31.	3 to 7, 10, 17, 25, 26, 28 to 31.
Swainsboro	100.0	69.0	82.8	6.16	August 30.....	2 to 6, 8, 24, 25, 29, 30.
Means	95.0	70.3	80.7	5.38	.....	.....

SOUTHEAST GEORGIA.

Blackshear	99.0	70.0	80.7	2.50	Aug. 29.	3, 4, 24, 29.
Brunswick	94.0	72.0	80.7	2.54	Aug. 19.	1, 2, 4, 6, 12, 14, 17, 19, 29, 30.
St. Mary's .....	.....	.....	.....	.....	.....	.....
Walthourville	92.0	70.0	72.6	4.00	Aug. 29.	1 to 6, 9, 10, 17, 25, 28 to 31.
Means	95.0	70.7	78.0	30.1	.....	.....
Means for State	92.8	68.1	78.1	5.90	.....	.....





Special Circular No. 11. }
NEW SERIES. }

REPORT OF GROWING CROPS, ETC., FOR THE MONTH
OF SEPTEMBER, 1880.

RETURNABLE OCTOBER 1st, 1880.

DEPARTMENT OF AGRICULTURE,

ATLANTA, GA., September 10, 1880.

DEAR SIR—Please answer the following questions **on the 1st day of October**, or a few days before, if necessary, and mail promptly, so that your report may reach this office **by the Third of October**.

Answer every question, that will permit of it, in numbers indicating per cent.

An AVERAGE CROP, or AVERAGE CONDITION, or anything with which comparison is made, is always taken as 100. Thus, if the corn crop at any time is 10 per cent. better than last year, or 10 per cent better than an average it should be reported as 110 in each case; and if ten per cent. below these standards, it should be 90. Never report "10 per cent. better" or "10 per cent. worse," but 110 or 90, as the case may be. So avoid vague comparisons, such as, "some better," "hardly so good," "above an average," etc.

In making up your answers, let them apply to the whole county in which you reside, or as far in every direction as your knowledge may extend, *not simply to your own farm.*

If a crop about which questions are asked is not grown in your county, use the character **X**. If you have not sufficient data to make an approximate estimate, leave the space blank.

Very Respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

I. For what county do you report?.....county.

II. Your name?

III. Your post-office?

REQUEST.—Having answered the above questions, and those on the following pages, *please fold the report as you received it* and **fill the blank on the back.**

FROM PRESENT INDICATIONS, WHAT WILL BE THE PROBABLE—

1. Total yield of Cotton *compared to last year*?per cent.
2. Total yield of Corn, *compared to last year*?per cent.
3. Total yield of Sugar Cane, *compared to last year*?per cent.
4. Total yield of Sweet Potatoes, *compared to last year*?per cent.
5. Is cotton picking as well advanced as at this time last year?
6. What per cent. of the crop has been gathered?per cent.
7. In what condition has it been gathered, compared to perfect?per cent.
8. What will be the probable injury from Caterpillars?per cent.
9. Have the seasons been favorable for picking Cotton?
10. Has the comparative failure of the Wheat and Oat crops of the last season had the effect of discouraging farmers from sowing the usual area in these grains?

NOTES FROM CORRESPONDENTS.

Under this head correspondents are invited to give their experience on the following, or such other subjects as may occur to them, as may be of general interest:

CHUFAS.—Conclusions reached, after several years experience, of the profitableness of this crop for hogs.

POTATOES.—Experience of the value of the sweet potato for feeding hogs, horses, cows, etc. How does it compare with the turnip in certainty and amount of yield and cost? *Best method of keeping?*

PEA VINES.—Give experience of the value of pea vines for hay, and as a renovating crop. Give actual and comparative results. Is there any increased disposition to sow peas for fertilizing purposes?

COTTON FIBRE.—It is suggested that the following test be instituted and the result reported in this report: Ascertain, by carefully weighing, the relative yield of lint and seed from cotton unmanured, and that manured with different fertilizers, respectively. Have experts to examine the samples of each, and report the comparative quality and value of the staple.

It is not expected that every reporter will write on all or either of the topics suggested. The object is to get *facts and actual experience*.

NOTE.—Correspondents wishing to communicate with the Commissioner on any subject not connected with this report, will please write on a separate sheet.

..... Reporter.

Report made this 1832.

NEW SERIES. }
Circular No. 12. }

RULES AND REGULATIONS

FOR THE

INSPECTION OF FERTILIZERS

IN GEORGIA.

SEASON OF 1880-81.

DEPARTMENT OF AGRICULTURE,
ATLANTA, September 15, 1880.

The Commissioner of Agriculture has adopted the following rules and regulations for the present fertilizer season :

I. Every package of fertilizer, or chemical for manufacturing the same, or for composting, intended for sale or distribution within the State of Georgia, shall have the manufacturer's guaranteed analysis placed upon, or securely attached to, each package, by the manufacturer. If the fertilizer is in bags, it shall be distinctly branded, stamped or printed upon each sack. If in barrels, it may be either branded, stamped or printed upon the head of each barrel, or distinctly printed upon good paper and securely pasted upon the head of each barrel; or upon a shipping or other tag, and securely attached to the head of each barrel. In every case it must be *distinct*. This manufacturer's guaranteed analysis shall show the following determinations, viz. :

Insoluble Phosphoric Acid.....	——— per cent.
Available Phosphoric Acid.....	——— per cent.
Ammonia, by Nitrogen determination.....	——— per cent.
Potash [K. O.].....	——— per cent.

If Nitrogen, in the form of Nitrate, is claimed, the fact must be stated to the Inspector when the guaranteed analysis is presented to him.

II. To facilitate the transaction of business, any manufacturer, dealer, agent, or other person, who procures the inspection of a fertilizer, may, after it is inspected and has the inspector's tag attached in compliance with law, proceed to make sales thereof before the official analysis is completed: *provided*, he gives a written obligation to cancel all sales in case the fertilizer is condemned by the Commissioner of Agriculture.

III. Inspectors shall not furnish any tag or device to be attached to any fertilizer, or permit it to be offered for sale or distribution, unless the manufacturer's guaranteed analysis is plainly placed upon each parcel or package, before offering the same for sale or distribution, claiming, in the case of any Ammoniated Superphosphate, that it contains at least 8 per cent. of available Phosphoric Acid and 2 per cent. of Ammonia; and of any Acid Phosphate or Dissolved Bone, that it contains at least 10 per cent. of available Phosphoric Acid; neither shall any such tag or device be furnished or applied to any fertilizer that is in a damaged or unmerchantable condition.

IV. Inspectors, after collecting inspection fees and taking samples, shall have applied, under their personal supervision, when practicable, inspector's tags, one to each package of fertilizer, *of the exact lot inspected* (unless otherwise specially instructed by the Commissioner), before the same is offered for sale or distribution. Inspector's tags will have printed upon each the words and figures, "Inspected—1880-81—Georgia;" also, a *fac simile* of the signature of the Inspector, and the consecutive tag number. Whenever it is found to be impracticable for Inspectors to personally supervise the application of tags, they may be delivered to the order of the person procuring the inspection. In such cases, Inspectors must avail themselves of all practicable means to satisfy themselves that the tags so delivered have been properly applied, *and to the packages for which they were issued.*

Manufacturers and dealers are hereby particularly cautioned against the indiscriminate application of tags. It is equally important to their interest as to that of the purchasers that the packages of fertilizer comprising each lot inspected may be identified in the hands of purchasers. This can only be done by applying the tags issued for each inspection to the packages, only, included in such inspection; and a failure to observe this Rule will be deemed a misapplication of tags, and may result in serious embarrassment to the manufacturer or dealer.

V. The Inspector's tag, when attached or applied in compliance with law, is a recognition that the fertilizer to which it is attached has the consent of the Commissioner of Agriculture to go to sale, under the conditions prescribed in Rules I and II, above recited.

VI. All fertilizers manufactured in this State, for sale or distribution within the State, must have been subject to all the requirements of the law and regulations, and the Inspector's fee must be paid, before it can be removed from the mill or factory.

VII. For the purpose of making inspections and executing the laws and regulations in relation to the inspection of fertilizers, the following persons have been appointed Inspectors, with offices at the places annexed to their names, viz.:

O. T. Rogers.....	Savannah
W. P. Harden	Augusta
Troup Butler.....	Brunswick
J. S. Lawton.....	Atlanta
E. L. Thomas.....	Macon
Geo. W. Rosette.....	Columbus

Whenever it is necessary to facilitate transportation, the Inspectors at Macon, Brunswick and Columbus will co-operate with the Inspectors at Savannah, Augusta and Atlanta. Inspections can be made at other points in Georgia than those named above, when necessary; but if, in such cases, the fertilizer shall have come into the State at any port or station where there is an Inspector, the necessary expense of the Inspector in going to make such inspection must be paid by the party procuring the same.

VIII. If necessary to facilitate transportation, inspections may be made outside of the State or in bulk, by special permission of the Commissioner of Agriculture, to whom application must be made by the party procuring it. In all such cases the expenses of the Inspector, incurred in making the inspection, must be paid by the party procuring it.

IX. In all cases, in making inspections, samples must be taken by the Inspector, *in person*. He must provide such samplers as will penetrate to the centre of the package, and samples must be taken from a sufficient number to fairly represent the whole—not less than one tenth of the packages in lots of ten tons or over, and not less than one-fifth of the packages in lots of less than ten tons.

X. Inspectors, at the time of first inspecting a fertilizer for the season, must request of the person procuring the same, three packages of each distinct brand, to be selected by the inspectors, to be used under the directions of the Commissioner of Agriculture in making a thorough soil-test. These three packages must be taken at once by the Inspector and carefully stored till called for by the Commissioner.

XI. Manufacturers of, and dealers in, fertilizers outside of the State, before making each shipment of fertilizers into Georgia for sale or distribution, are required to notify the Commissioner of Agriculture, directly, and also the Inspector at the port or place where the same is to enter the State, in writing, of such shipment, giving the name of the vessel or railroad on which shipped, the name of each distinct brand, and the number of tons of each; the number and kind of packages and their weight; the name and place of the consignee; and accompany this information by a copy of the guaranteed analysis. Let this notice be timely, to both the Commissioner and the Inspector. It will facilitate business and result in advantage to those who give such timely notice.

XII. As far as possible, all fertilizers must be inspected at the port of entry or place where they come into the State. Inspectors are

required to be vigilant, and see that none escapes. Dealers in the interior of the State, to whom fertilizers (coming into the State at points where there are no inspectors) are consigned, must give timely notice to the Commissioner of Agriculture and to the Inspector nearest to the point where they enter the State, and must be prepared to furnish the Inspector with the necessary guaranty and give all required obligations, and to pay to him the inspection fee, by the time the fertilizer arrives. All persons in Georgia who expect to deal in fertilizers or have fertilizers shipped to them during the coming season, for sale or distribution, will please take due notice, and make all necessary arrangements to meet the requirements of law promptly when the fertilizer reaches the State, and thus save delay and embarrassment. The law must be enforced, and parties interested will greatly oblige, by taking such timely steps as will insure its easy execution, without annoyance to themselves or others.

XIII. An Act, "To protect more effectually the planters of Georgia from imposition in the sale of fertilizers," etc., approved February 26, 1874, provides in section I: "That from and after the passage of this Act, it shall not be lawful to sell, or offer for sale, any fertilizer manufactured in this State, or to bring into the State for sale and distribution any fertilizer manufactured beyond the limits of the State, unless, before offering for sale, or the sale or distribution of the same, there shall be an inspection and an analysis made of it," etc. Section III of the same Act provides for the punishment, according to section 4310 of the Code of 1873, of any person selling fertilizers without inspection.

"An Act to render more efficient and economical the inspection and analysis of fertilizers," etc., approved February 26, 1877, provides that "Any manufacturer, dealer or other person, offering any fertilizer, or chemical for manufacturing the same, for sale or distribution in this State, without having a brand, tag, or such other device as the Commissioner of Agriculture may require, showing the analysis thereof, shall be guilty of a misdemeanor, and, on conviction of the same, shall be punished as prescribed in section 4310 of the Revised Code of 1873."

Section VI of the above cited Act, approved February 28, 1874, requires the inspectors to prosecute violators of these laws.

The law will be rigidly enforced, and the Inspectors held to a strict performance of their duties.

XIV. The season for inspecting fertilizers will be from September 1st to the 31st of August following.

XV. The method of analysis recommended by the recent Convention of Agricultural Chemists, held at Washington, D. C., on the 28th of July, 1880, is hereby adopted, and will be employed by the Chemist of the Department in the analysis of all commercial fertilizers. Copies of the proceedings of said Convention will be sent to applicants.

J. T. HENDERSON,
Commissioner of Agriculture.

NEW SERIES. }
Special Circular No. 12. }

SPECIAL INSTRUCTIONS
TO
INSPECTORS OF FERTILIZERS
IN GEORGIA.

SEASON OF 1880-81.

DEPARTMENT OF AGRICULTURE,
ATLANTA, September 15, 1880.

To

Inspector of Fertilizers,

....., *Ga.*

DEAR SIR: It is of the utmost importance to the planters and people of Georgia—to yourself and the Department of Agriculture—that your duties be well and faithfully performed. You are placed as a sentinel to see that the interests of the farmers of Georgia are well guarded in their purchases of commercial fertilizers; that they are protected from imposition in every purchase that they make, and that the laws defining your duties, and the regulations of the Department, are rigidly executed in every case. You are, in your official acts, to render full justice to all parties. The strict execution of the law, and full protection from imposition to all farmers, will not work injustice to any manufacturer or dealer.

In the discharge of your duty, in addition to the Rules and Regulations laid down in Circular No. 12, you are to be governed by the following special instructions, giving some details which could not well be set forth in that Circular, viz.:

I. Fertilizers purchased outside of the State, by a consumer or farmer in Georgia, for his *own use*, and not for sale or distribution, shall be

permitted to pass without inspection if the purchaser desires it, provided it is sent directly to said purchaser, addressed or consigned to him personally, and not directed to, or passing through the hands of, a commission merchant or third party. You must, as far as practicable, report all such shipments to the Commissioner of Agriculture, giving the names of brands, the names and places of consignees, and the number of tons; and enter the same in your official record.

II. You must not inspect any fertilizer till the person or firm desiring inspection has—

1. Paid you in cash the inspection fee of 50 cents per ton for every ton to be inspected.

2. Placed the exact name in full, of the fertilizer to be inspected, upon each package, and placed the guaranteed analysis upon each package.

3. Given an obligation in writing to cancel and make null all sales which may be made of said fertilizer before the official analysis thereof is made, if after being analyzed the Commissioner of Agriculture shall, in pursuance of law, prohibit its sale.

Soil-test packages of *every distinct brand* of fertilizer are to be requested only *once* during the season, viz.: at the time of making the *first* inspection of any brand.

You must not inspect any fertilizer if the *minimum* per centage of any of the valuable ingredients named in the guaranteed analysis is less than that required by law, viz.: 8 per cent. of available phosphoric acid and 2 per cent. of ammonia in ammoniated super-phosphates, or 10 per cent. of available phosphoric acid in acid phosphates or dissolved bone.

III. Immediately after taking samples of any brand of fertilizer, in the manner described in Rule IX of the Regulations for Inspections, they must be *thoroughly mixed*, but not triturated or ground in a mortar, or otherwise. When samples are forwarded to the Department for analysis, they must be in the same *mechanical condition* in which they are offered for sale to the planters in the State. After the samples are thus thoroughly mixed, you will, from the mixture, fill two glass bottles (common quinine bottles), securely seal them with wax, stamp your private seal upon the wax, and then carefully and correctly label them—one with a label showing the inspection number, name of the fertilizer inspected, the place at, and for whom inspected, the date of inspection; and the other with a label showing the number of inspection. You must then deliver both in person to the Commissioner, or carefully box and ship them to him by express.

IV. You are required to keep in a book a full and accurate record, or minute of every official act performed by you, and of everything connected with the movement of, or trade in, fertilizers that may be important, giving name, dates, and facts in full, as indicated in the blank forms furnished you.

V. Record the date of *forwarding all samples* to the Commissioner of Agriculture for analysis.

Report promptly to the Commissioner any violations of law.

The book of records or minutes is the property of the Department, and must be neatly and correctly kept. It must be filed in the Department with your final report, made at the end of the fertilizer season.

You will be required to make arrangements for storing and shipping soil-test samples, under instructions from the Commissioner of Agriculture.

When you make the *first* inspection for the season of any brand of fertilizer outside of the State, you must then and there request the soil-test samples to be put up and shipped to your address, freight prepaid, by the manufacturer or dealer, and the same to be stored by you, as before directed.

Blanks will be furnished you for making all your records, entries, and reports, and stationery for official correspondence.

Inspectors' tags and sample bottles will be supplied to you on your requisition, freight prepaid, and you must retain the cost of the same and all charges, from fees received, and pay the amount to this office at the end of each month.

The Act of 26th February, 1877, requires you to pay over to the Comptroller General, on the first day of each month, all moneys received for inspection fees during the preceding month. This must be done in whatever manner the Comptroller may prescribe; and you must satisfy the Commissioner that this duty has been performed before a salary certificate will be issued to you.

You are specially required to guard against any misappropriation of Inspectors' tags, or for any violation or evasion of the law, or of any attempts to do so, and make full reports to the Department of Agriculture.

You will be required to render a strict account of all tags issued to you, and held liable to the Treasury for the amount of fees represented by any tags not satisfactorily accounted for.

Any information you may need will be given at any time. Instructions will be given promptly in any case in which you may desire them, or about which you are in doubt.

Inspectors will be held to a strict performance of all duties required of them by the law, and the rules, regulations and instructions defining their duties. No neglect or irregularities in the discharge of their duties will be tolerated.

J. T. HENDERSON,

Commissioner of Agriculture.

A

MANUAL ON CATTLE:

FOR THE USE OF

THE FARMERS OF GEORGIA.

PREPARED UNDER THE DIRECTION OF

J. T. HENDERSON,

COMMISSIONER OF AGRICULTURE FOR THE STATE OF GEORGIA.

ATLANTA, GEORGIA:

JAMES P. HARRISON & CO., PRINTERS.

1880.

INTRODUCTION.

THE Act establishing this Department, approved February 28, 1874, section 7, defining the duties of the Commissioner of Agriculture, says : " Said Commissioner shall report, as hereinbefore set forth, upon any matter of interest in connection with the dairy, that he may deem of interest to the people of this State."

While this section relates particularly to "matter of interest in connection with the dairy," this work will not be confined to the dairy, but will treat the general subject of cattle-raising in Georgia, in such manner as will convey to the reader, in the most condensed form, the information needed by every owner of cattle to insure profit and guard against loss by disease and neglect. The reception accorded the "Manual of Sheep Husbandry in Georgia" and the "Manual on the Hog," by the reading public, inspires confidence that one on the Cow, in which every family, however humble, is interested, will not be an unwelcome visitor to the homes of the farmers of Georgia.

The facts connected with rearing cattle in Georgia, with the practice pursued by stock-raisers in different parts of the State, have been collected in the usual manner by means of questions sent to those best informed, on the subject in hand, in every county.

The answers to some of these questions have been consolidated and the results given; others have been used as the basis of remark.

The leading authors on cattle have been liberally consulted and the information derived from them blended with the results of a large experience and extensive observation, condensed into the smallest space compatible with perspicuity, and made applicable to the circumstances by which the farmers of Georgia are surrounded.

Reference has been made to "Flint on Milch Cows and Dairy Farming," "Youatt & Martin on Cattle," "American Cattle," by Allen; "American Cattle Doctor," by Dadd; "How to Select a Cow," by Willis P. Hazard; "Practical Butter Book," by Willard; "The Dairy Cow—Ayrshire," by Sturtevant; "Practical Dairy Husbandry," by Willard; "Cattle, their Breeds, Management, and Diseases," by Youatt; "Soiling Cattle," by Quincy; "American Dairying," by Arnold; "Grasses and Forage Plants," by Flint; and Howard's "Manual of the Cultivation of Grasses and Forage Plants." Free use has been made also of such illustrations found in these works as suited the purpose of this. This method is taken of making proper acknowledgments for assistance derived from these works, which are recommended to those who desire to make a thorough study of the subjects on which they treat.

A MANUAL ON CATTLE.

CHAPTER I.

QUESTIONS ON CATTLE RAISING IN GEORGIA.

The following questions were sent to stock-breeders in every county in the State for the purpose of collecting facts from their experience and observation :—

1. What distinct breeds of cattle have you tested ?
2. Which have proved most profitable ?
3. What crosses have you tested ?
4. Which have proved most profitable ?
5. How many cattle do you keep ?
6. What kind do you breed at this time ?
7. What breed or cross have you found most profitable for beef ?
8. What breed or cross gives the largest yield of milk ?
9. What breed or cross gives the largest yield of butter ?
10. What breed or cross do you recommend for general purposes, or combination—for beef and dairy ?
11. Give the results of any experiments that have been made in your county in the production of cheese ?
12. What is the annual average cost, per head, of keeping cattle in your county ?
13. What per cent. per annum, on the investment and annual cost of keeping, do they pay ?

14. What is the average daily yield of milk to the cow?
15. What is the average quantity of milk, in pounds or quarts, required to make a pound of butter?
16. Give the results of any experiments that you have made, to test the effects of different kinds and combinations of food, on the flow of milk, and the quantity and quality of butter?
17. What is the average price at which butter sells in your county?
18. What is the average price per pound, net, at which beef sells in your county?
19. What is the average price per pound, gross, at which beef sells in your county?
20. What is the average weight of beef cattle, as they are sold in your county?
21. What is the average price at which milch cows sell in your county? Report also maximum and minimum prices.
22. What summer pasturage have your cattle?
23. Give the results of experiments, if any, in your county in soiling cattle.
24. Give the results of experiments in tethering out cattle on grass?
25. How do you rank Bermuda grass as pasture for cattle?
26. Do you feed your cattle in winter?
27. If so, on what do you feed them principally?
28. How long do they require it?
29. If not fed, on what do they subsist during winter?
30. What crop yields the largest amount of forage for winter food at the least cost?
31. What for feeding green in summer?
32. Do you pen your cattle at night?
33. Do you pen them on culturable land, or in permanent pens in which the manure is saved to be hauled out?
34. Give facts as to the area annually fertilized by a given number of cattle, so as to double the crop?

35. Give facts as to the results of soiling in the production of manure?
36. Give facts as to results attained in crops produced from manure saved from cattle.
37. Give facts as to the quantity of manure saved per head from cattle penned, under shelter, with the usual mixture of litter.
38. Give the results of experiments in dairy farming—cost, yield, and profits.
39. What diseases have proved most destructive to cattle in your county?
40. What remedies have been successfully used? Describe each disease and its remedy.
41. What per cent. of cattle in your county are annually lost by disease?
42. What breed or cross gives the best work oxen for farm use?
43. Have you used beef, corned or pickled, as a substitute for bacon on the farm?
44. If so, give the result of your experience as to its economy.
45. Do you select heifers to be reserved for milch cows, with reference to the “escutcheon” or “milk mirror,” according to the Guenon system?
46. What has been the result of your observation as to the correctness of the sign as indicating milking properties?
47. At what age do your heifers commence to breed with best results?—for dairy purposes? At what for beef?
48. To what age do you find it profitable to keep milch cows?
49. What is the per cent. of increase per annum in calves, on the number of cows kept?
50. Do you allow the calves to suck their mothers, or do you raise them by hand from their birth?

51. Which plan has given better results ?
 52. What are the principal obstacles to successful cattle raising in your county ?
 53. What remedies do you suggest ?
 54. Give any other information in your possession, that may be of value to the farmers of Georgia.
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CHAPTER II.

FACTS ELICITED FROM THE QUESTIONS ON CATTLE RAISING IN GEORGIA.

The following breeds are reported as having been tested to a limited extent, viz.:

Short Horn, Devon, Ayrshire, Hereford, Brahmin and Jersey, the Devon and Jersey being the only ones that have been tested to any extent as thoroughbreds. There are only a few herds of Devons and only about two dozen herds of Jerseys. The great majority of tests, however, have been limited to the introduction of thoroughbred males which were crossed upon the common cows.

In fact, therefore, the Devons and Jerseys are the only breeds proper which have been tested to any extent as such, the test of others having been confined principally to their grades. There have been no thorough comparative tests of the different breeds to ascertain which is best adapted to the farm in different parts of the State, the readiness with which sales of the offspring could be made, having generally been the controlling influence in determining the variety kept by the principal breeders.

There has been to some extent comparative tests of grades, but these have been too general in their character to afford the data necessary to the formation of intelligent

opinions of their comparative merits and profits. Few simultaneous tests have been made under circumstances which enabled the breeder to keep accurate records of the cost, yield and profits of the different breeds, crosses or grades, and hence the reports of "which have proved most profitable" being based upon mere casual observations of tests, made probably at considerable intervals of time, are mere opinions, and not absolute facts. The opinion, however, is almost unanimous in favor of the pure breeds and their grades as improvements upon the common stock.

The average number of cattle kept by the correspondents is twenty-nine, and with few exceptions they are now breeding either grades or common stock, known as "natives." They report grades of Jersey, Devon, Short-Horn, Ayrshire, Brahmin, Hereford, the crosses of some of these; and a few the thoroughbred Jersey, Devon, Ayrshire or Short-Horn.

A few report a little cheese made for family use, but none for market.

The average annual cost per head of keeping cattle is five dollars. This varies from nothing in Southern Georgia to as high as thirty dollars in one instance in North Georgia. Where the high cost is reported, reference is made to milch cows, which are fed through the larger part of the year. A large majority of those who report any cost at all, range from two to five dollars per head.

They report an average annual profit per annum of forty per cent. upon the investment and the annual cost of keeping cattle. The average daily yield of milk, per cow, for the whole State, is reported at five quarts; and the average quantity of milk required to make one pound of butter is reported at ten quarts.

The average price received for butter per pound is twenty cents.

The average price per pound of beef sold from the farm is, net, five cents; gross, two and a quarter cents.

The average net weight of beef cattle, as sold from the farm, is reported at three hundred and forty-two pounds.

The average price at which milch cows sell in the State, is reported at \$18.32, the reports ranging from \$8.00 to \$100.00, as minima and maxima prices.

The maximum is for common cows giving extraordinary yields of milk, or for thoroughbreds.

The minimum is reported from those sections where but little attention is paid to milch cows, as such, but where the principal attention is given to the production of beef.

For summer pasturage, the native grasses, embracing wire grass, broom sedge, Bermuda,* crab grass, and other varieties of less note, are used.

Many report the "range," which means that their cattle run out during summer on the commons and in the woods, some of which afford very superior pasturage during the late spring and early summer months, and, except in cases of severe drouth, throughout the season.

A few only report inclosed pastures of clover, orchard grass and herds grass.

All who have utilized Bermuda grass concur in the opinion that it is unsurpassed for summer pasturage, a large majority reporting it "the best."

Very few have experimented with soiling or tethering cattle, but those who have tried either generally report favorably as to results.

Milch cows and calves are fed during the winter in every section of the State from one to six months, according to latitude, but in Middle and Southern Georgia dry cattle are fed but little, especially where they have access to the wild cane along the creek and river bottoms.

Among the substances reported as fed to cattle in winter are shucks, corn-fodder, oats, straw from small grain and

* Bermuda, though not a native, is generally so classed because it grows spontaneously.

rice, cane-fodder, cotton-seed, turnips, peas and pea-vines, barley cut green, crab-grass hay, German millet hay, clover and grass hay, rice flour and sweet potatoes.

When not fed, they have the range of the whole plantation except the small grain fields, and subsist upon the gleanings of the fields and upon the wild cane and grass about the creeks.

In answer to the question, "What crop yields the largest amount of forage for winter food, at the least cost?" a large majority report drilled corn; some report pea-vines, some crab grass hay; some, the millets; some, turnips, and others clovers and the cultivated grasses.

For feeding green in summer, the majority report in favor of cat-tail millet; some in favor of drilled corn; some, peavines, and others clover.

All the correspondents report penning their cattle at night during the whole or a part of the year; some on cultivable lands, and some in permanent pens from which the manure is collected and carted out to the fields.

None have conducted accurate experiments as to the amount of manure annually saved per head, or the area annually fertilized by a given number of cattle so as to double the crop. All, however, testify very strongly as to the great value of cow manure, many giving it a decided preference over that from horses on account of its conservative action upon summer crops in our climate.

No accurate experiments as to the "cost, yield and profits" of dairy farming have been made, and, except in the immediate vicinity of the cities, no strictly dairy farming has been done.

Forty correspondents report no destructive disease; forty-one report murrain or redwater; many make no report at all on the subject. Some report no disease since 1860. Others report no disease since the black tongue prevailed in 1856. There is perhaps no country in which cattle are more remarkably exempt from disease than in Georgia.

The annual loss by disease in the State is reported at $4\frac{1}{2}$ per cent., but many of the most intelligent correspondents say that many cases of death which are attributed to disease are the result of neglect, and often of starvation, during winter.

Very few have given any attention to the selection of heifers to be reserved as milk cows with reference to the "escutcheon" or "milk mirror," according to the Guenon system. Those who have experimented in such selection, almost without exception express the opinion that its indications are generally correct.

Quite a number say they make no selection, but reserve all of the heifer calves as breeders. This is especially true of the southeastern portion of the State, where large herds are kept on what is known as the wire grass range.

Heifers are generally allowed to breed at will and commence at from two to three years of age.

Milch cows are kept in use from ten to fifteen years.

The per cent. of increase in calves per annum, on the number of cows kept, is sixty-five.

Very few report raising calves by hand. Those who have tried it, however, report in its favor, almost without exception, and many who do not practice it say it gives better results than allowing them to suck their mothers.

In answer to the question, "What are the principal obstacles to successful cattle raising in your county?" nearly all of the correspondents say none, except neglect on the part of farmers to supply the necessary pasturage and to bestow proper attention upon their stock.

The rearing of cattle being merely incidental to other more important branches of agriculture, on the part of most farmers in the State, but little attention is bestowed upon them further than to secure a supply of milk and butter for family use, and the cattle generally being allowed to run out on the commons, the owners of the cows have

no choice of the sires of their calves. Occasionally, enterprising breeders are so generous as to turn improved bulls out for the public good, to the material advantage of the stock of the neighborhood, but such are exceptional cases.

CHAPTER III.

HISTORICAL SKETCH.

While we have no authentic history of the early usages in the management of cattle, we have both in sacred and profane history repeated mention of the ownership of cattle. In the fourth chapter of Genesis, 20th verse, we read that Jabel "was the father of such as dwell in tents, and of such as have cattle." It would seem, therefore, that the owners of cattle in that day, which was during the lifetime of Adam, led a pastoral life and dwelt in tents. Later, after Jacob, the most noted cattle-breeder of ancient times of whom we have any record, had left Laban, whose herds he had tended for twenty years, we read in Genesis, chapter 33, 17th verse, "And Jacob journeyed to Succoth, and built him a house, and made *booths* for his cattle." Succoth has about the latitude of Savannah, Ga., and yet this veteran stock-breeder saw proper to make "booths" for his cattle.

Though Abel is spoken of as "a keeper of sheep," the word sheep is supposed to be used as a generic term representing different kinds of domestic animals.

It is a well settled fact that the use of cattle as domestic animals is coeval with man's existence on this globe, and that in the early stages of man's development and progress towards civilized life, cattle have been largely relied upon as a source both of food and profit.

Profane history is equally clear in representing the domestication of cattle, since they were objects of worship among the Egyptians and of veneration among the Indians. The traditions of the Celtic nations, as well as the sculptures of the Egyptians, place cattle among the earliest productions, and represent them as constituting, as in the days of Abraham and Jacob, one of the principal elements of the wealth of nations and individuals, and continued so until agriculture became more generally practiced, when less attention was given them, until within the last two centuries, when they received more attention, and improvement commenced.

When Julius Cæsar invaded Britain, he found the Britons neglecting tillage and living principally upon milk and flesh.

The unsettled political condition of the country at that time, and the consequent insecurity of property, made that class of property which could be removed to a place of security with the greatest expedition most desirable. Cattle being of this class, and but little tillage practiced, the Britons relied mainly upon them for food, not only during the baronial period, but even after one sovereign reigned over the whole kingdom. Contests at arms being still of frequent occurrence, and fixed property consequently insecure, the rearing of cattle continued to be the leading pursuit of the people.

When the political condition of the country became more settled, agriculture received more attention and the rearing of cattle less, until within the last two centuries, when a few breeders commenced improving their stock by judicious crossing and selection.

There are two remarkable facts in connection with the history of cattle in England ;

1st. The number of breeds with distinctive characteristics in a territory of such limited extent.

2d. That the first classification of cattle should have had reference entirely to their *horns*.

The former was perhaps due principally to selection and close breeding without intermixture from other sections, as well as to the variety of climate and pasturage in different sections of the kingdom. Indeed, we are told by Youatt that the Glamorganshire farmers "admitted of no mixture of foreign blood."

On this subject Mr. Youatt says :

"The breeds of cattle, as they are now found in Great Britain, are almost as various as the soil of the different districts, or the fancies of the breeders. They have, however, been very conveniently classed according to the comparative size of the horns; the *long horns*, originally from Lancashire, much improved by Mr. Bakewell, of Leicestershire, and established through the greater part of the midland counties; the *short horns*, mostly cultivated in the northern counties and in Lincolnshire, and many of them found in every part of the kingdom where the farmer attends much to his dairy or a large supply of milk is wanted; and the *middle horns*, not derived from a mixture of the two preceding, but a distinct, valuable and beautiful breed, inhabiting the north of Devon, the east of Sussex, Herefordshire, and Gloucestershire; and of diminished bulk, and with somewhat different character, the cattle of the Scottish and the Welsh mountains. The Alderney, with her *crumpled horn*, is found on the Southern coast, and in smaller numbers in gentlemen's parks and pleasure grounds everywhere; while the polled, or *hornless* cattle, prevail in Suffolk and Norfolk, and in Galloway, whence they were first derived."

The *middle horns* seem to have been the original breed of British cattle, the *long horns* of Irish extraction, the polls though they have "existed in certain districts from time immemorial, were probably an accidental variety."

The short horns lay no claim to this honor, having had their origin in careful selection, a little more than a century ago.

The improvement in the form, beauty and adaptation of cattle to the uses of man during the last century has been most remarkable, and has been effected by careful and skillful selection of breeding animals and judicious crossing. Indeed the different varieties have been so bred as to develop peculiar characteristics and adaptation to specific purposes, as well as to combine such characteristics into one harmonious whole in the same breed.

IN AMERICA.

The first introduction of cattle was by the Spaniards, about 1525, into Mexico; the next into Virginia in 1610 and 1611 from England. They were introduced into New York from Holland in 1625, and into Massachusetts from England in 1624. The Dutch settled New Jersey in 1624, and the Swedes, Delaware in 1627, and brought their cattle with them. In 1631, 1632 and 1633, cattle were imported into New Hampshire from Denmark. English cattle were brought into Maryland in 1633, into North Carolina in 1660, into South Carolina in 1670, and into Pennsylvania in 1682. Georgia was not settled until 1732, and there is no record of the introduction of cattle at that time. It is probable that the first that were brought into the State came with settlers from other colonies.

CHAPTER IV.

DIFFERENT BREEDS AND THEIR CHARACTERISTICS

Before proceeding to the discussion of the different breeds it will be well to define definitely some of the terms which will occur in this chapter.

A BREED is a race, class or kind of animals, having certain peculiarities of form and other characteristics different from others of the same family.

THOROUGHbred animals are those which have been bred in a direct line sufficiently long to establish a fixed type which they have the power of transmitting with uniformity to their offspring.

FULL-BLOOD.—In Kentucky the results of the sixth cross are called *full-blood*. This should not be confounded with *thoroughbred*, as an animal that is called *full-blooded* is only 63-64 of the blood of the thoroughbred used in the cross. Thus the first cross of a thoroughbred bull on a "native" cow, produces a half breed—the next cross of the thoroughbred on the half breed produces 3-4, the third cross of thoroughbred, on the 3-4 produces 7-8, on 7-8, 15-16, on 15-16, 31-32, on 31-32, 63-64, which is called *full-blood*. The uninitiated are liable to be, and sometimes have been, imposed upon by confounding full-blood with thoroughbred.

CROSS-BRED animals are the offspring of a thoroughbred male of one breed out of a thoroughbred female of another.

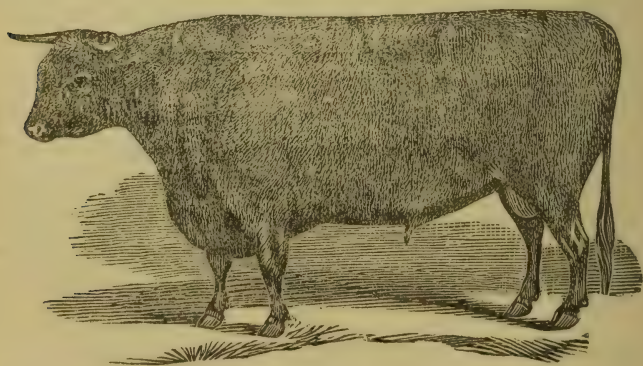
GRADES are the offspring of a thoroughbred male or female, and what are known as common stock, which belong to no particular breed; or any other than thoroughbred or cross-bred.

HIGH GRADES are those having a preponderance of pure blood, such as the offspring of a thoroughbred bull out of a half-blood cow, which is called three-fourths. Full-blood animals are high grades.

LOW GRADES embrace half breeds and all the gradations below, so long as the impress of the thoroughbred is visible.

“COMMON STOCK,” “SCRUBS” or “NATIVES” are those which have been indiscriminately bred until there is no recognizable trace of any breed and no uniformity of type. To this class belong nearly all of the cattle in Georgia.

The only breeds which are bred pure in America, are the Devon, Durham or Short-Horn, Ayrshire, Jersey, Alderney, Holstein or Dutch, and Hereford. In Europe, the Angus Polled, the Galloway, and the Scotch Highland are highly esteemed, but, as yet, none of consequence have been imported into and bred pure in this country. We have polled cattle in America, and in Georgia, but none have been bred pure on this side of the Atlantic.



Devon Bull.

DEVONS.

This beautiful race of cattle is of such great antiquity that there is no record of their origin; some claiming that they date as far back as the Roman conquest.

The Devons occupy the relation to other breeds of cattle that the Southdown does to other breeds of sheep, and the Essex to other breeds of hogs. No other breed is more fixed in its type, none more distinct, none of greater antiquity, and none with more points of excellence as a combination animal. There are some that excel them as beef producers, others as butter producers, and others still at the pail; but no other breed equals them in symmetry of form, uniformity of type, or as combination beef, dairy, and work animals. Allen in his work on American cattle, describes the typical Devon as follows:

“The head, lean in flesh, is rather short, the forehead broad, the face slightly dishing, and tapering gracefully to a fine, clean *yellow* muzzle. The eye, bright, prominent, and surrounded by a ring of orange colored, or yellow skin. The horn, upright and curved outward, cream colored, black at the tips, graceful in its setting, and rather long, for the size of the animal. The ear, well set, and lively in action. The neck, on a level (in the bull slightly arching) with the head and shoulders; full at its junction with the breast, clean, and without dewlap. The shoulders, fine, open (somewhat slanting, like those of the horse), and on a level with the back. The neck-vein, full, and smooth. The arm, delicate, and the leg below the knee, small, terminating in a clean, dull brown, and somewhat striped hoof. The brisket, full, and projecting well forward. The crops, well filled, and even with the shoulders. The back, straight from the shoulders to the tail. The ribs, springing out roundly from the back, and running low down, to enclose a full chest, and setting well back towards the hips, giving a snug neat belly. The flanks full and low. The hips wide, and level with the back. The loin full and level. The thigh well fleshed and full, the lower part somewhat thin, and gracefully tapering to the hock; the leg below, small, flat and sinewy. The twist (the space be-

tween the thighs) well let down and open. The tail tapering like a drum-stick, and terminating with a brush of *white* hair. The color, invariably cherry red, sometimes showing a lighter, or deeper shade, and the skin, under the hair, a rich cream color. The bull, of course, will show the stronger and masculine character of his sex, while the ox will develop the finer points of his condition, and the cow, all the delicacy and refinement belonging to her race."

The earliest records of the Devon as a breed show that from time immemorial they were bred in the Northern part of Devonshire, whence the name of North Devon.

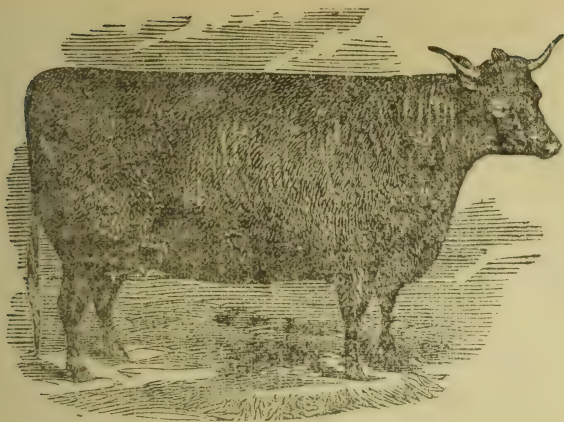
They have since spread into other counties of England and been imported in considerable numbers to America. Unlike other breeds of more modern origin, there seems to have been no infusion of other blood of which there is either history or tradition. By selection, their size has been somewhat increased, their beef producing qualities improved, and their milking qualities diminished thereby.

AS WORK OXEN,

All things considered they have no superior for ordinary farm use. They are muscular, active and durable. Their uniformity of color and type causes them to match readily and when turned off for beef they fatten readily and produce beef of fine quality.

AS A MILCH COW,

The Devon may be classed as medium in the quantity and superior in the quality of yield. The yield depends, of course, somewhat upon the object for which they have been bred. In herds in which selection has been made with a view to the development of milking properties they have made good records, while in others in which the production of beef was the leading object they have deteriorated as milkers.



Devon Heifer.

They are docile, easily kept, managed without difficulty and so tidy in form and appearance that the owner has every inducement to bestow proper attention upon them.

A few parties have been breeding the Devon in Georgia for years with satisfactory results. Correspondents from Burke county speak in especially favorable terms of the Devon. Mr. J. B. Jones, of that county, says: "For Middle, South, Southeast, and Southwest Georgia, I would breed only Devons for any and all purposes."

Dr. W. B. Jones, of the same county, says: "Grades of any good breed are more profitable than natives; thoroughbred cattle, of any class or breed, means thorough keeping and feeding. Grades are much hardier than natives, and for milk, beef or work oxen, Devons have proved to me to be the cattle fitted for my especial latitude and climate."

A large number of common cattle, especially in Middle Georgia, which are known as "red English" are thought to be the result of a remote cross of the Devon on the "Natives." It is proper to say that the "red English" are highly esteemed wherever they are found in Georgia,

for their good qualities at the pail, on the shambles or under the yoke.

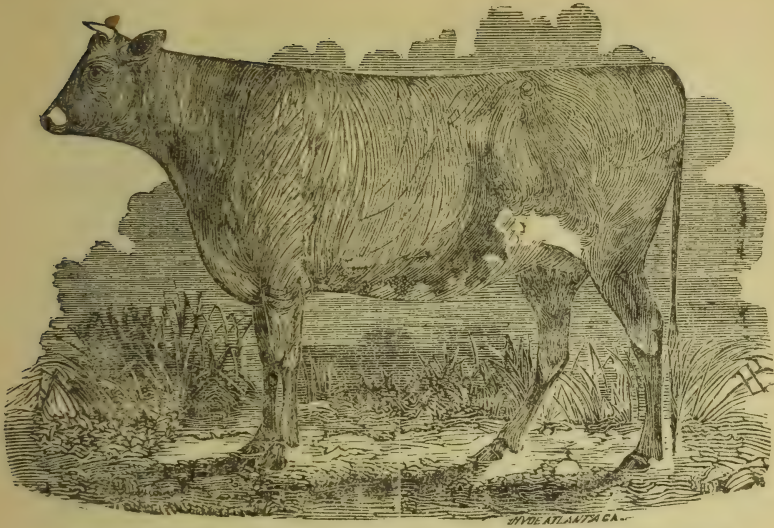
The Devon breed of cattle is of such antiquity, and consequently so firmly fixed in type, that it gives a very decided impress upon its offspring even when crossed upon very inferior animals, and hence the improvement resulting from their cross is perceptible even after the source of the improvement has been forgotten. In speaking of the Devon,

AS A BEEF ANIMAL,

Allen says : " We must place the Devon in the first class, for fineness of flesh and delicacy of flavor. Its compact bone gives it the one, and its rapid and thorough development under good feeding gives it the other. In growth and size it matures early, equal to the Shorthorn, and its meat is finer grained, juicy and nicely marbled (the lean and fat intermixed).

In the London markets, Devon beef bears the highest price of any except the Highland Scott—usually a penny a pound over that of the larger breeds, and our American butchers quickly pick the Devons from a drove, when they can find them, before most others. They feed well, take on flesh rapidly, and in the quality of their flesh, are all that can be desired."

The first importation of Devons of which there is any record was made by Messrs. Caton and Patterson, of Baltimore, Maryland, in 1817. There have been various importations since, but they have never excited the enthusiasm that the Shorthorns have in some sections and the Jerseys in others.



Jersey Heifer, LADY BARON; Herd Register, 10,109; Property of
R. PETERS, Atlanta, Ga.

CHANNEL ISLAND CATTLE—ALDERNEY, JERSEY, AND GUERNSEY.

This valuable breed of dairy cattle is supposed to have come originally from Normandy in the Northern part of France. They were formerly called Alderneys from the fact that the first that were introduced into England were sent from the Island of Alderney by some officers of the British army as presents to friends in England.

From this circumstance all of the channel island cattle were for a time called Alderneys, notwithstanding the fact that twice as many are exported from Jersey as from Guernsey, while very few are exported from Alderney.

Jersey contains 39,580 acres, 25,000 of which are in cultivation. Its population in 1861 was 56,078. Guernsey has 15,560 acres, 10,000 of which are in cultivation. Its population in 1861 was 29,780. Alderney has only 2,500 acres of which 1,500 are cultivated. Its population in

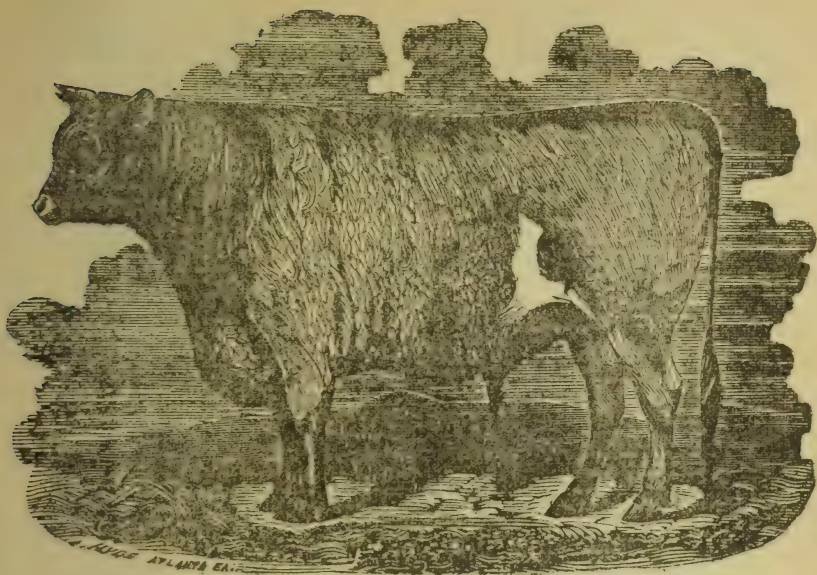
1861 was 4,933. The impropriety of the Island of Alderney giving name to the cattle from all of the islands is therefore apparent. The cattle from Alderney and Guernsey are somewhat larger in size and coarser in type than those from Jersey. So few, however, are reared on Alderney that they are hardly worthy of consideration.

The large majority of Channel Island cattle now in America are either importations from the Island of Jersey or their descendants, and the name of Jerseys is now often applied to all the Channel Island cattle, as Alderney was at first.

The Alderneys, Guernseys and Jerseys are all remarkable for the richness of their milk and the large quantity and superior quality of the butter produced from it.

With few exceptions, the importations into Georgia have been of the Jerseys proper. They are emphatically butter cows, and are no doubt the "best breed" for Georgia where the production of "gilt-edged" butter is the object of the breeder, provided he is willing to bestow the necessary attention upon them. If the sale of milk is the object, other breeds will prove more profitable to the dairyman, but even in that event it may be advantageous to keep several Jerseys to every eight or ten of other breeds to give richness and color to the whole of the milk.

There are some very fine herds of Jerseys in Georgia, and the number is being rapidly increased by purchase from the best herds of the Middle and Eastern States. The great docility of Jersey cows peculiarly fits them to become family pets, and their marked difference of type from the common stock of the country, and their blood-like appearance, impresses the observer with their purity and superiority of breeding. There is a characteristic expression of meekness and gentleness of disposition about the Jersey cows possessed by no other breed.



Jersey Bull, "BARON OF BELMONT;" Herd Register 4,821; Property of R. PETERS, Atlanta, Ga.

Taking the best herds seen in this country, which probably have as high qualities of breeding and excellence as those on their native Island, some of which, indeed, were direct importations, the following description will enable even the novice to recognize the thoroughbred Jersey:

The head is fine and tapering, muzzle black or dark-brown, sometimes yellowish with a ring of lighter color encircling it and shading off to a darker color towards the head; the jaws clean, throat tapering and free from dew-lap. The neck is usually a little drooped, sometimes "ewe-necked," but many of the best specimens now straight from the rump to the horns. There is a peculiar mealy appearance about the lighter colors on the face, belly, legs and twist, gradually shading off into a darker, smoky hue above. The ears are rather large for the size of the animal, and hang off from the head in a peculiar

manner—they should be of a rich orange color within. The horns curved inward, small, waxy towards the base and black towards the ends. There is a peculiar deer-like, blooded appearance about the head. The shoulders are wide and prominent, tapering down to delicate, trim legs. Fore-quarters somewhat thin, and ribs a little flat and deficient in arch; belly deep and large; hips wide apart; thighs thin, twist wide, affording room for a capacious udder, which is square, reaching well forward, teats rather small, but standing well apart and tapering gracefully. The modern Jerseys have much more symmetry than those of twenty years ago, the best specimens having the peculiar wedge shape, tapering from their hips forward, so indicative of good milkers.

The color varies with the fancy of breeders, from a light fawn to a smoky gray and even black, sometimes splashed with white, but the skin should be invariably yellow.

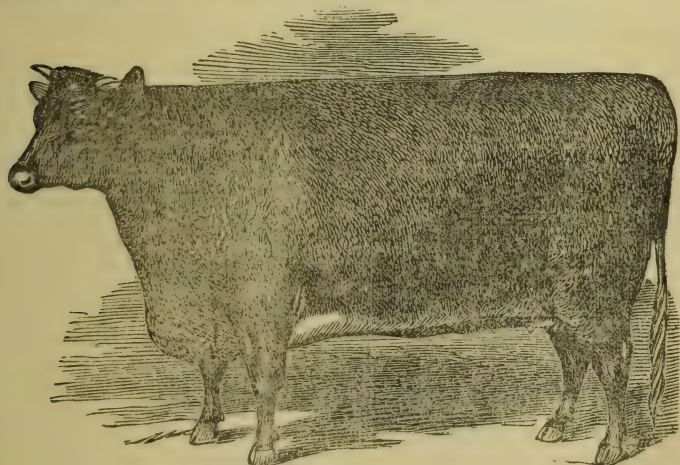
The bull will of course have the masculine features peculiar to his sex, and though the cows are noted for their docility and amiability, the bull is usually vicious at two years of age and often dangerous as he grows older.

A Jersey ox is seldom seen as yet in this country, and though they may feed well and make a moderately fair quality of beef, no one would seek the Jersey for either work or beef animals. Their peculiar use is for butter production, in which they excel. As a pet in a gentleman's lawn, or in a family dairy, they are unrivaled, or even in a dairy the object of which is to make high-priced butter, they excel any other breed; but the chief profit at present from breeding thoroughbred Jerseys is derived from the sale of young animals. They have not been sufficiently tested in Georgia to determine to what extent they are adapted for general purposes of the farm, but it is believed that a cross of Jersey bulls on our common cows will materially improve the cattle of the State, especially in butter production.

BUTTER YIELD OF JERSEY COW EUROTAS.

This remarkable cow, Eurotas, H. B. Register, 2454, has been on trial nine months and six days to August 9th, during which time she has yielded, by actual and accurate weight, 706 pounds and 3 ounces of butter. The test was commenced on the 10th of November, 1879; the last report was to August 15th. Her largest yield was June 15th and 16th, when she yielded in the two days six pounds and six ounces, or three pounds and three ounces per day. It will be observed that the greater part of the test was made during the winter and spring when she had no green food.

The high price at which the thoroughbred Jerseys sell will, for some time at least, prevent their very general purchase by farmers in moderate circumstances.



Short Horn Heifer of Beef Strain.

SHORT HORN, OR DURHAM.

This magnificent breed of cattle has, during the present century, received more attention in England and America than all others together. They seem to have originated as such in Durham county, England (whence the name, Dur-

ham), on the river Tees (whence the name, Teeswater), which divides the county of Durham from that of York. They are supposed to have come originally from the northern part of Denmark, at the time of the conquest by the Danes of the northeastern coast of England.

They seem, therefore, to have had the same origin as the Dutch or Holstein cattle, now so celebrated for their large yield of milk.

As early as 1738, Milbank and Croft were noted as cattle-breeders, but not until the time of the Collings, about 1780, was the great merit of the short horns brought prominently before the public. Mr. Charles Colling adopted an efficient method of advertising the breed, and especially his own herd.

He reared an ox of extraordinary size, and sold him, when five years old to a Mr. Bulmer, to be taken "around the country for exhibition." His live weight was then 3,024 pounds. After traveling with him for five weeks, Mr. Bulmer sold the ox to Mr. Day, who traveled with him nearly six years. He was butchered when eleven years of age, after he was much reduced by the effects of an accident—the dislocation of his hip bone—and weighed, carcass, tallow and hide, 2,620 pounds. Mr. Colling afterwards fed a thoroughbred heifer, which was exhibited in the same way through the country. She was known as the "White Heifer that traveled." When slaughtered, her live weight was estimated at 2,300 pounds.

Through the exhibition of these remarkable cattle, public attention was directed to the merits of the Short Horns and to Mr. Charles Colling as a breeder, who thus acquired such celebrity that he soon realized a fortune from the sale of his stock.

The first importation of Short Horns into America, of which we have record, was made by a Mr. Miller, of Virginia, in 1783. These were celebrated as milking stock.

Some of the decendants of these were taken to Kentucky in 1797 by Mr. Patton, after whose name they were long called the "Patton Stock." Others were carried to the Morefield valley along the south branch of the Potomac, a fine grass region, where they became very celebrated.

They are popular in all the fine grass regions of the United States where beef is the principal object of the breeder.

Some families of them which have been bred with special reference to milk production, have given satisfactory results as dairy animals, but the Short Horn is essentially a beef animal, no other breed that has been introduced into America, except the Hereford, making any pretense to rivalry in this respect. As a combination animal for beef and milk, however the Short Horns far surpass the Herefords, the latter making, however, superior work oxen.

CHARACTERISTICS.

The Short Horns may be divided into two classes; beef and dairy stock. The early importations were selected with reference to their milking properties, and some of them were quite celebrated for their large yields. In the Eastern states, Virginia and East Tennessee, the Short Horns have been bred mainly to the dairy type, while in Kentucky and the Western states they have been bred chiefly for beef.

Where there is a full bite of grass, they make superior dairy animals, and, when turned off, have the advantage over the smaller dairy breeds, in feeding more readily and affording a larger yield of fine beef.

There are few farms in Georgia at present, however, on which the pasturage is sufficiently luxuriant to justify the hope of satisfactory results from the use of Short Horns; the more hardy and active small breeds are better suited to our present condition.

When more attention shall be paid to cultivating the grasses in North Georgia, the Short Horns may be profitably employed in that section of the State, and their grades in other sections.

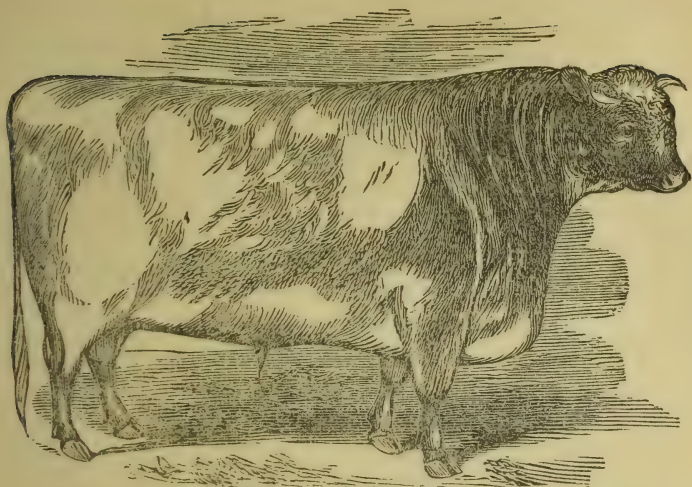
In those states of the Union in which beef is the principal object of the herdsman, the Short Horn of the beef type has been bred at the expense of the milking properties. The earlier importations having been to the Atlantic States, where milk was an important consideration, selections of imported animals were made with reference to their milking properties; and the selections for breeding purposes from their offspring were made with the same view.

The later importations, made after the English breeders, stimulated by the increased demand for beef and enticed by the natural tendency of the Short Horns to beef production, had bred to that end by the selection of the best looking animals for propagating their kind, were mainly carried to Kentucky and west of the Ohio river, where grass was abundant and beef more marketable than dairy products.

Under the same influences, selections were made of the most precocious animals, giving the best promise of beef production.

The influence of selection upon the type of the breed has nowhere been more fully illustrated than in the establishment and perpetuation of the beef and milking strains of Short Horns.

The early maturity of the Short Horns gives them a decided advantage over other breeds. A Short Horn bullock will make more and better beef at two years of age than a native will at four; but the Short Horn to obtain the best development must have abundant food from calfhood to maturity.



Short Horn Bull.

Allen thus described the typical Short Horn :

HEAD.

“The muzzle fine and yellowish, or drab in color, not smoky or black ; the face slightly dishing or concave ; the eye full and bright ; the forehead broad ; the horns showing no black except at the tips, and standing wide at the base, short oval shaped, spreading gracefully out, and then curving in with a downward inclination, or turning upward with a still further spread (as either form is taken without prejudice to purity of blood in the animal), of a waxy color, and sometimes darker at the tips ; the throat clean, without dewlap ; the ear sizable, thin and quickly moving ; the neck full, setting well into the shoulders and breast, with a slight pendulous hanging of the skin (not dewlap) just at the brisket ; the shoulders nearly straight, and wide at the tops ; the shoulder-points, or neck-vein, wide and full ; the brisket, broad, low, and projecting well forward, sometimes so much as almost to appear a deformity ; the

arm gracefully tapering to the knee, and below that a leg of fine bone, ending with a well rounded foot; the ribs round and full (giving free play to vigorous lungs), and running back well towards the hips; the crops full, but as a rule scarcely equal in fullness to the Devons; the chine and back straight from the shoulders to the tail; the hips *uncommonly* wide, and level with the back and loin; the loin full and level; the rumps wide; the tail set on a level with the back, small and tapering; the thigh full and heavily fleshed; the twist wide; the flank low and full; the hock, or gembrel joint, standing straight (as with a horse), or nearly so; the hind legs, like the fore ones, clean and sinewy, and the foot small.

The dairy strain have less of the rotundity of form than the beef strain, the cows tapering well from rear to front; but when they are turned off they feed readily, and make a large quantity of excellent beef.

The beauty of the Short Horn as a beef animal consists in the small amount of waste in the carcass, either in inferior flesh or in bone, and in the large amount of superior flesh on the most valuable parts.

In color, thoroughbred Short Horns are found pure white, deep red, and with every conceivable mingling of the two, according to the fancy of different breeders.

AS A DAIRY COW

The Short Horns have strong advocates, and where bred with a view to the development of milking properties, they have made good records.

Being large, they of course consume more food per head than smaller milking breeds, but have the advantage of yielding a large quantity of good beef when no longer needed at the pail.

Allen says: "That the *inherent* quality of abundant milking exists in Short Horns, no intelligent breeder of them

need doubt; our own observation in more than thirty years experience with hundreds of them, first and last, under our own eyes, is to ourself evidence of the fact, both in thoroughbreds and grades."

Few men in America, if any, have had so large and varied experience and observation as Mr. Allen, and his testimony is therefore valuable for the section in which he lived (New York). There is no question, however, of the fact that the cross of the Short Horn bull on native cows in Georgia has invariably resulted in an improvement of the stock, both as to milking properties and beef-production.

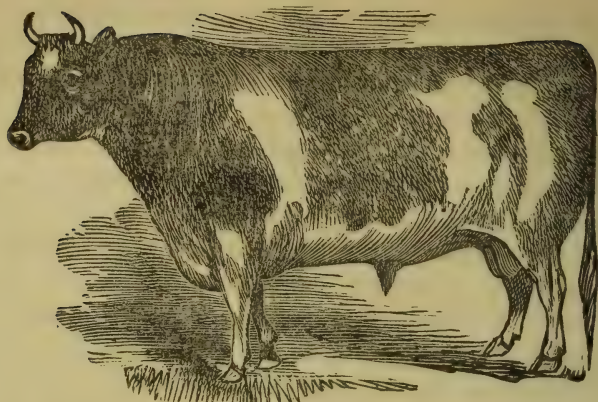
The effects of the introduction of a Short Horn bull into neighborhoods in Georgia, have been observed in the improvement of the stock of the neighborhood for many years afterwards. This is particularly true where reasonable attention has been paid to cattle, and the pasturage is good. In some portions of the United States the milking qualities have been bred out until good milkers are rare. When importations have been made from such herds, there has been a deterioration rather than an improvement in the milking properties of the stock resulting from the cross, while there has been decided increase in size.

Those in Georgia who desire a cross of the Short Horn, should be careful to select from herds that have been bred to milk rather than beef, as the former is generally the leading object in raising cattle in this State.

Before purchasing, however, good pasturage must be supplied, or the Short Horns will rapidly deteriorate.

AYRSHIRES.

The origin of this breed which has become so popular for the dairy, seems to be involved in some degree of uncertainty. They seem to have had for the foundation of the breed the Scotch Kylvie cattle, and improved by crosses



Ayrshire Bull.

of Short Horn and Holderness, and probably with an infusion of "Dutch" blood.

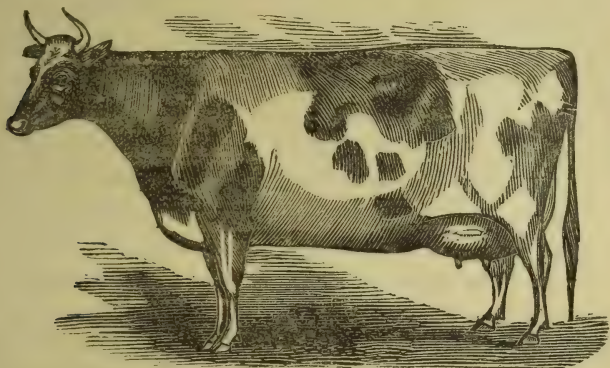
Mr. Allen says: "From no other race of cattle, Scotch, English or Irish, could the *improved* Ayrshires get their shape, color, and milking qualities combined."

They have been bred with special reference to the development of their milking qualities by selecting, for breeding purposes, only the offspring of good cows which gave promise of developing into good milkers. Allen says: "That they are a good breed of cattle, useful, and eminently qualified for the dairy, and capable of perpetuating among themselves their good qualities, are facts now well established both in Scotland and America."

The first importation into America of which we know was made in 1831, and their forty-eight years' trial in this country has been quite satisfactory. They are hardy, healthy, docile, and eminently adapted to our climate and pasturage. They will thrive where the Short Horn or Hereford will rapidly decline in size.

Though their yield of milk is less in our climate than in the more moist one of their native Ayrshire in Scotland, in proportion to their size they yield more milk than any

other breed except, perhaps, the Dutch, or Holstein. Their milk is less rich in cream than that of the Jersey, but it is of fair quality and so far exceeds the Jersey in quantity that the average yield of butter per cow is fine in quantity though inferior in quality to that from the Jerseys.



Ayrshire Cow.

DESCRIPTION OF TYPICAL AYRSHIRE.

In the prize essays of the Highland and Agricultural Society of Scotland, 1866-7, we find the following description of the Ayrshire: "Head short, forehead wide, nose fine between the muzzle and eyes. Muzzle moderately large; eyes full and lively. Horns, wide set on, inclining upwards, and curving slightly inwards. Neck, long and straight from the head to the tip of the shoulder; free from loose skin on the under side, fine at its junction with the head, and the muscles symmetrically enlarging towards the shoulders, shoulders thin at the top; brisket light. Forequarters thin in front, and gradually increasing in depth and thickness backward. Back short and straight; spine well defined especially at shoulders; short ribs arched. Body deep at the flanks; pelvis, long, broad, and straight. Hook loins wide apart, and not much overlaid with fat. Thighs deep and broad; tail long and slender,

and set on level with the back ; legs short, the bones fine, and the joints firm. Milk vessel, capacious and extending well forward, hinder part broad and firmly attached to the body ; the sole or under surface nearly level. Teats, from two to two and a half inches in length, equal in thickness, and hanging perpendicularly ; their distance apart at the sides should be equal to about one-third of the length of the vessel, and across to about one-half of the breadth. Milk veins well developed ; skin, soft and elastic ; hair, soft, close and woolly ; color preferred, brown, or brown and white, the colors being distinctly defined." Brown is a rather deeper shade than is usually seen in this country. Indeed, they are usually described in the herd book as red and white, or white and red, as the one or the other color predominates, and this depending largely upon the fancy of the breeder.

The well developed Ayrshire cow viewed from the front, presents the appearance of a blunted wedge, such is the taper from the hips forward.

They yield readily to kind and gentle treatment, and resent harshness with angry gestures.

They are naturally less amiable than the Jersey cows, but respond as readily to kind treatment, while they are more disposed to resent unkindness.

The annual yield of milk in some of the principal Scotch dairies, in which Ayrshire cows were kept, is reported at from 550 to 1,000 gallons. Ayrshire cattle being of medium size and hardy, are well adapted to Georgia farms, where a reasonable bite of grass is available ; and are especially suited to use in dairy farms near cities, where there is a market for milk.

The cross of the Ayrshire bull upon our native cows would rapidly build up dairy herds.

The fact that Ayrshires have the colors usually seen in our common cattle, militates against their introduction,

those not familiar with their type being often suspicious of them as thoroughbreds.

Flint says: "The Ayrshires have been developed to such a degree, that they may be said to produce a larger quantity of rich milk and butter in proportion to the food consumed or the cost of production, than any of the pure-bred races."

So exclusively did the farmers of Ayrshire breed to milk that Aiton says: "The Ayrshire farmers prefer their dairy bulls according to the feminine aspect of their heads and necks, and wish them not round behind, but broad at the hook-bones and hips, and full in the flanks."

HEREFORDS.

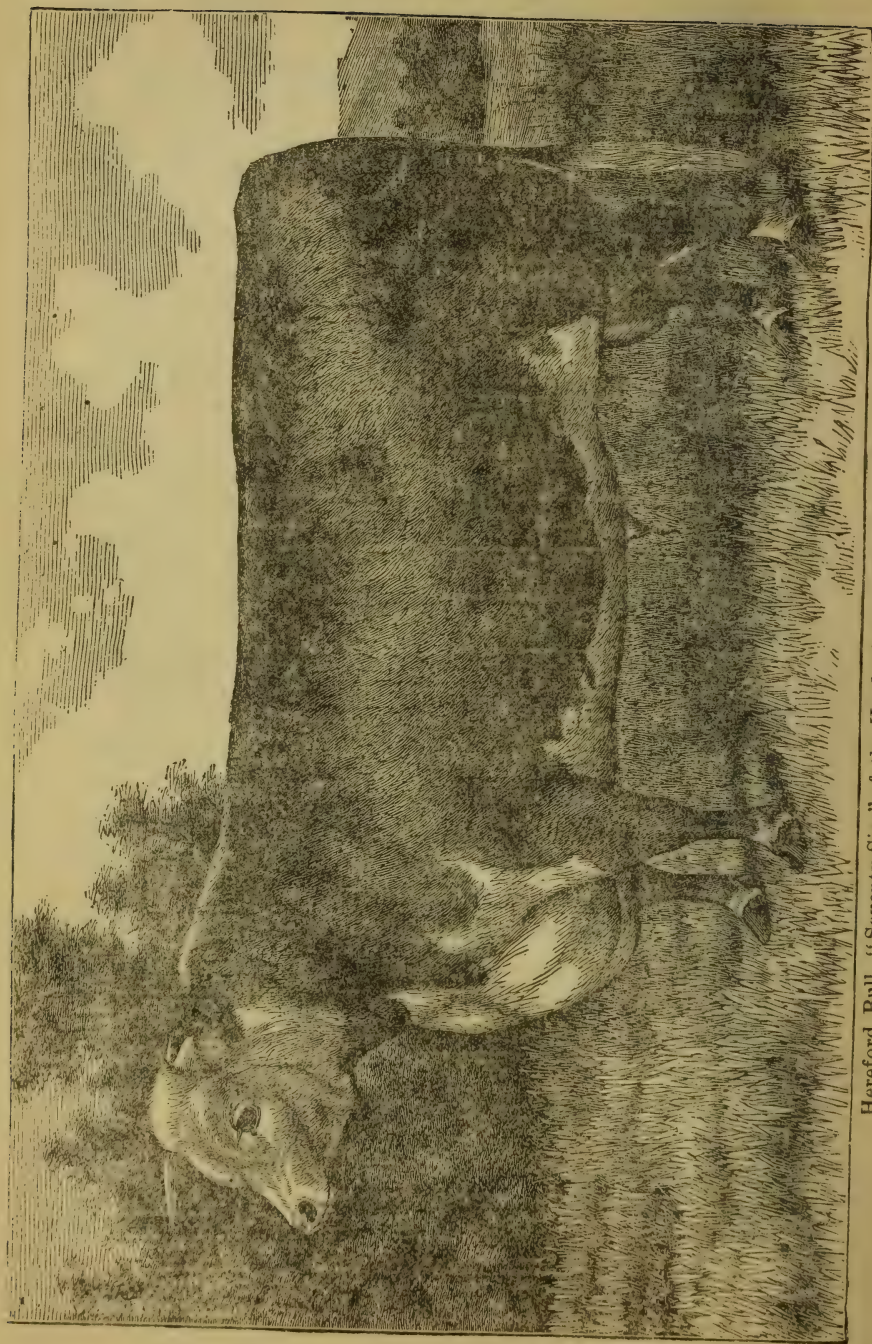
This breed takes its name from Hereford, a county in the western part of England, where they are said to have originated.

Their improvement seems to have commenced about the middle of the last century. They were formerly of a brownish red color with mottled faces.

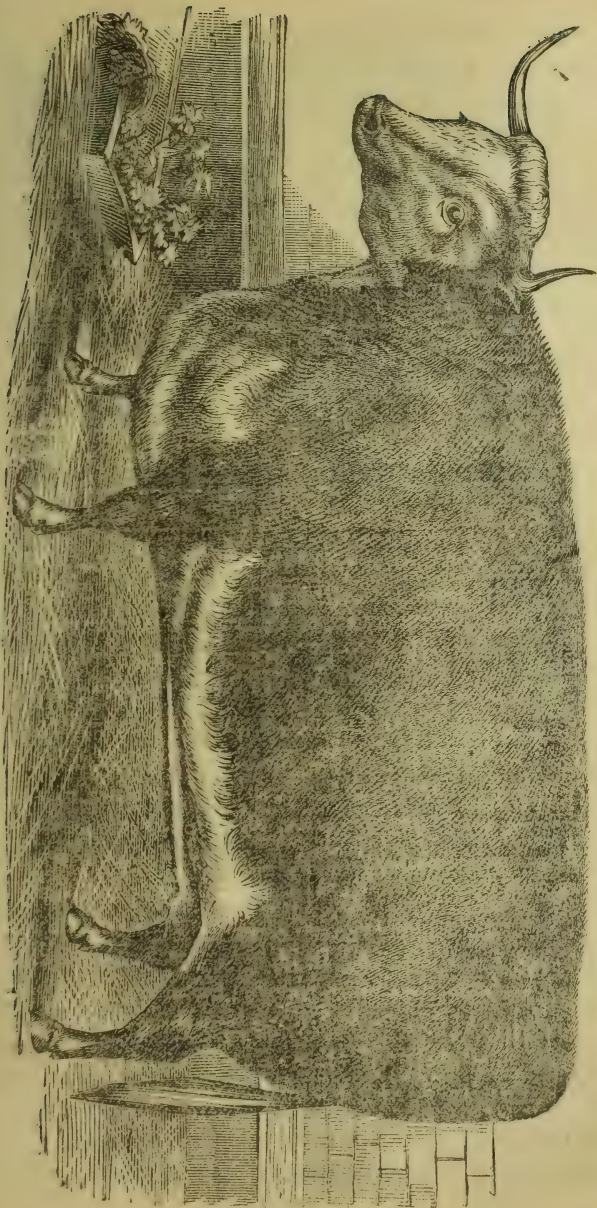
The most fashionable color now is pale red with white faces, the white often extending along the throat, under the brisket and belly, and along the back. The origin of the white face is thus accounted for by Mr. Rowlandson, in his "Farming of Herefordshire: "

"About the middle of the last century (1750), the cowman (of the herd of Mr. Tully) came to the house, announcing as a remarkable fact, that the favorite cow had produced a white-faced bull calf. This had never been known to have occurred before, and as a curiosity, it was agreed that the animal should be kept and reared as a future sire." He further remarks that "the progeny of this very bull, became celebrated for white faces."

The Herefords are quite celebrated in England as beef producers, and have their advocates in America, but



Hereford Bull, "Seventy-Six," of the Herd of John Merryman, Esq., Baltimore, Md.



Hereford Prize Ox.

have not attained to the popularity that other breeds have, probably on account of their deficiency in milk production. It is an old and well established breed and stamp their type in a marked degree upon their progeny. For years after the use of a Hereford bull upon the common cows of a neighborhood, the effects of the cross are observable in the progeny possessing only one-eighth Hereford blood. Very fine Herefords have been introduced into Georgia—not enough to give them a fair trial. A bull now in use in Clinch county, Ga., is reported to have materially improved the size of the cattle in his neighborhood.

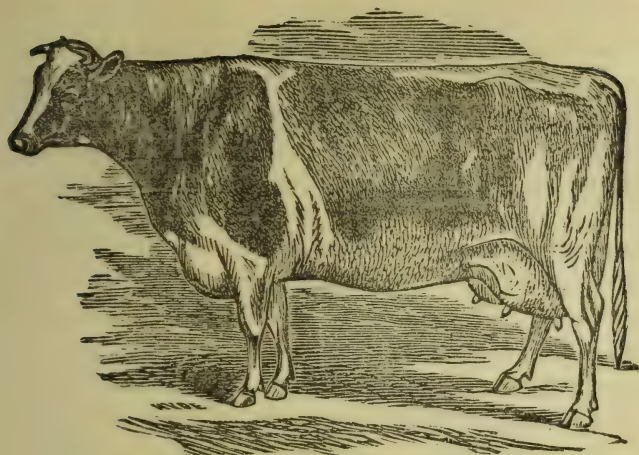
Like the Short Horn, they require a full bite of grass, and are hence not well adapted to sections in which natural grasses are the only dependence for pasturage. When our market facilities for beef increase, and more attention is paid to the cultivation of the grasses, the larger breeds of beef-producing cattle will become more profitable and popular. At present the smaller, milk producing breeds, are better adapted to Georgia, and give better satisfaction.

As beef-producers, the Herefords rival even the Short Horns, under the same circumstances, but the latter are so far superior as milkers, that the partiality already established for them will be difficult to overcome.

THE HOLSTEIN OR DUTCH CATTLE.

Comparatively few of this valuable milking breed have been brought to America, notwithstanding the fact that they have been long celebrated as a dairy breed, and are claimed to have been the source from which the Short Horns and Ayrshires derived their milk-producing qualities.

In color they are black-and-white, not mingled but each color distinctly marked and clear. In form they somewhat resemble the Short Horns of the milking strains, though less rounded in outline. In size they are some-



Holstein or Dutch Cow.

what smaller than the Short Horn. The four cows imported by Mr. Chenery, of Boston, Mass., in 1861, had an average live weight of 1325 pounds.

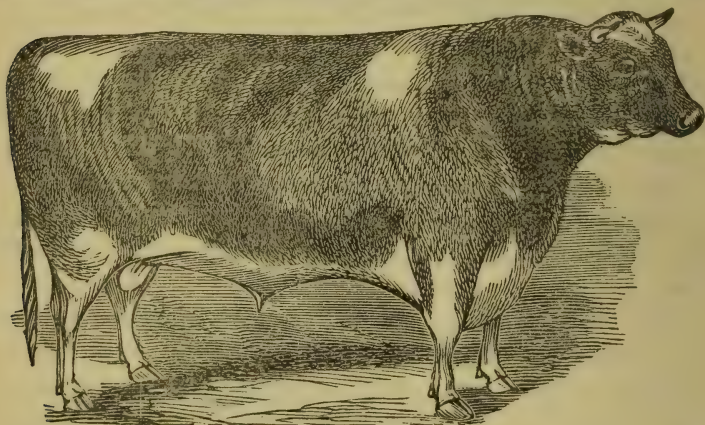
They, as far as tested in this country, have given great satisfaction as dairy stock, their milk being similar in quality to that of the Ayrshire and yielded in greater quantity.

Mr. Allen, speaking of the milking qualities of the Holsteins imported by Mr. Chenery, says: "The milking qualities of the breed may be judged by the following memoranda: one of the imported cows when six years old, dropped a calf on the 15th of May, weighing 101 pounds; and from the 26th of May, to the 27th of July, by a careful and exact record, gave 4018 pounds 4 ounces of milk. The largest yield in any one day, was 76 pounds 5 ounces, (35½ quarts.)

"In ten days she gave 744 pounds 12 ounces, or an average of 74 47-100 pounds per day. She gave a good flow of milk during the season, continuing to the 24th of May following, and on the succeeding day dropped twin

heifer calves, which weighed 155 pounds. * * * Six day's milk of this cow were set for cream, and the produce was 17 pounds 14 ounces of good butter, nearly 3 pounds per day, and it is claimed by her owner that she is *not* the *very best* cow of the herd." The milk though in very large quantity is of good quality, and is especially rich in casine. It is not a little remarkable that more of this valuable breed have not been imported into the United States, so satisfactory has been the experience of those who have tested them. The grade heifers by Dutch bulls inherit much of the fine milking qualities of the thoroughbreds.

Judge John L. Hopkins, of Fulton county, Ga., has imported a few of this breed, and is well pleased with them.



Holstein or Dutch Bull.

The fact that their color corresponds with that of many of the native cattle, will prevent to some extent, their rapid introduction, as has been the case with the Ayrshire. An experienced breeder remarks that "while he considered the Ayrshire the most valuable breed he had tested, he could not sell their offspring, because their color corresponded so nearly with that of the native cattle." Their characteristics are not sufficiently distinctive so take the eye of the average farmer.

AS BEEF ANIMALS

The Holsteins have been but little tested in this country, but they are represented as giving satisfactory results where thoroughly tested. Allen says, "A pair of oxen, five years old, gave a live weight of 4,600 pounds, and proved superior workers, showing that they were trained for labor and not for beef alone."

THE GALLOWS.

Have never been bred pure, so far as is known, in the United States, but, from the early settlement of this country, their grades have formed no inconsiderable part of what are known under the name of "native" cattle. They are known through the country as "mulies" or "polled" cattle. Apart from their good qualities, which consist in docility, combined with fair milk and beef production, many prefer them on account of their being hornless, and consequently harmless to each other, and less dangerous to those who manage them, than those with horns. Some of the grade polled cattle have made very fine records at the milk pail, where they have been bred for the dairy.

ANGUS POLLED CATTLE.

This fine breed of polled or hornless cattle has not until recently been introduced into the United States. They were brought into especial notoriety as the premium fat cattle at the recent World's Fair at Paris. The country people in Angus call them "humlies" or "dodded" cattle. The attention of breeders on the coast of Kincardineshire, seems first to have been directed to them on account of their docility and the facility with which they fattened. Like the Herefords and the beef strains of Short Horns, they have been bred so persistently to beef that their

milking qualities have declined. They resemble their ancestors, the Galloways, in many respects. Their prevailing color is black with occasional white spots.

WHAT ARE "NATIVES?"

While, of course, there are no native cattle in the proper sense of the term on this continent, by general consent the common cattle of the country, which have been indiscriminately bred for so long that they have no distinctive characteristics, are called "natives." They constitute the great bulk of the cattle of this State, embracing all those which cannot be traced back to pure-bred ancestry. They have no fixed type and though some of their characteristics are transmitted to their offspring, being without uniformity themselves, there is no certainty as to the character of the offspring. They have every variety of form, color and quality; some are superior milkers when well cared for, and when selection is made with a view to the dairy qualities of the offspring for a number of years their improvement is often very marked.

AS BEEF ANIMALS they vary as much as in other qualities, some attaining with good treatment, large size and making excellent beef.

AS WORK OXEN they are often superior when they attain sufficient size which they will generally do under good treatment.

Among the so-called natives, individuals are often found showing decided marks of improved blood, even in neighborhoods in which there have been no thoroughbred stock for years.

They answer a good purpose, perhaps better than thoroughbreds, under circumstances of neglect and poor pasturage, and under good treatment on abundant pastures, they attain good size, make serviceable work oxen and pay well at the pail. They, and grades of a few of the pure

breeds, will be the dependence in Georgia for many years to come.

Thoroughbred bulls, of either beef or dairy breeds, crossed on large native cows give very superior animals for general farm purposes.

CHAPTER V.

ADAPTATION OF GEORGIA TO THE PRODUCTION OF NEAT CATTLE.

Georgia possesses every requisite for the successful production of neat cattle whether they are grown for the dairy or for beef, if man will do his part.

THE CLIMATE OF GEORGIA embraces a variety ranging from a mean temperature of 64° to 68° F. in the southern, to 52° to 56° F. in the mountainous belts.

On this subject the following extract from the Hand Book of Georgia is appropriate: "In nothing regarding us is a greater mistake made abroad, and indeed, in some parts of our own country, than in the climate, or atmospheric condition of Georgia. The State being in the southern portion of the union, lying between parallels of latitude 30°, 39', 27''(average) and 35°, the stranger naturally concludes that our climate is mild and delightful in winter; and in this he is correct. We have but little snow—in more than half the State none at all for years together. We import or manufacture all our ice, and field work may be kept up at all seasons of the year. The difficulty with strangers is in determining the character of our climate during the summer months.

"The winters being pleasant and genial, they conclude, without further investigation, that the summers must nec-

essarily be hot and sultry. This is a serious mistake, as all will testify who have any practical knowledge of the subject. No finer summer climate is to be found on the continent, east of the Mississippi river, than that of many parts of Georgia, and, as a whole, it will compare favorably with that of the states north-west. Carefully conducted observations, year after year, show that the mean annual temperature of the city of Atlanta, our state capital, is the same with that of Washington City, Louisville, Ky., and St. Louis, Mo., which are from 800 to 880 miles further north.

“The mean annual temperature south of a line drawn across the state from Augusta to Columbus, is between 64° and 68° F.; between the same line and another parallel to it, and running twenty miles south of Atlanta, we have a mean annual temperature between 60° and 64° F.; in another strip of territory, including Atlanta, we have a mean temperature for the year, of between 56° and 60° F. In what is known as upper Georgia, it is between 52° and 56° F., while in the mountains it is below 52° F.

“The mean of Gainesville, in Hall county, and of Clarks-ville and Mt. Airy, in Habersham county, corresponds with that of central Ohio, Indiana, Illinois, upper Missouri and lower Nebraska.” * * * “In explanation of these facts, certain features in the geographical situation and physical conformation of the state must be taken into consideration. In lower Georgia we find the greatest degree of heat in summer, the mercury sometimes rising as high as 96° rarely above that figure. It lies however, between the Atlantic Ocean and the Gulf of Mexico, in close proximity to both and the temperature is greatly modified by the strong currents of sea air which continually pass from one of these great bodies of water to the other. The mean temperature of Savannah, in the south-eastern portion of the state during the months of June, July and August, is 79° to 80° ; and in no part of

southern Georgia does the mercury often rise above 90° , whilst in winter it seldom descends to the freezing point. Sun-strokes, so common in the northern and northwestern states, are almost wholly unknown in Georgia. "Elevation affects temperature on an average, 1° Fahrenheit for every 300 feet. This alone would make a difference in Georgia of 16° , by reason of relative elevation between the shore level and the highest summit.

"It is also affected by latitude, and there being a difference of about $4\frac{1}{2}^{\circ}$ between the northern and southern limits of the state, the thermometer should show a difference of about 9° in the temperature.

"But latitude, without the aid of elevation, may not always materially affect temperature. There are other natural causes that may antagonize its influence. The difference in the length of the days may increase the summer range in more northern latitudes.

"At New York, for instance, in mid-summer the days are nearly an hour longer than they are at Savannah, and at Quebec, in Canada, nearly one hour and a half longer, and the nights correspondingly shorter; the consequence is, at New York there is one hour longer for the heat to accumulate from the direct rays of the sun, and one hour less time at night for the heat thus accumulated to be carried off by radiation. This is said to be the cause why Northern latitudes are hotter in summer than Southern latitudes.

"Finally, we have no hesitation in saying that, take it the year round, the climate of Georgia is equal to any to be found on the globe, whether we regard personal comfort in indoor and in outdoor work, or for the production of crops for the support of man and beast, both in the summer and the winter months. We may mention a fact in this connection:

"The city of Atlanta is situated within a few miles of the

southern line of what is called northern or upper Georgia, which contains the mountainous region, and yet we know many farmers in the immediate vicinity, who have pastured their stock throughout the past winter, and kept them in excellent condition on the growing crops of wheat, rye and barley." As regards

RAINFALL,

Georgia has an abundant annual supply, generally well distributed through the year.

The following from the Farmers' Scientific Manual, shows that there is no lack of rain for the production of crops for cattle: "The average annual rainfall for five years, from 1871 to 1875, inclusive, at West End, near Atlanta, is found to be 53.32 inches, and at Macon 54.88 inches. From observations through a long series of years, by the Smithsonian Institute, it has been found that the average annual amount of rainfall in the several sections of the State is approximately as follows: "north Georgia fifty inches, middle and east Georgia, the northern part of southwest Georgia and southeast Georgia, 55 inches, the middle portion of southwest Georgia, 60 inches; and the extreme southern part of southwest Georgia, 65 inches;—average for the State about 54 inches.

There is every variety of soil from the sand-bed to the stiffest clay, and every variety of topography from the broad plains in the south, gradually passing into the hill country of middle Georgia, which in turn rises with increasing elevation to the mountains of north Georgia.

Throughout these varied circumstances of soil and climate, cattle thrive and under the careless, neglectful system generally pursued, yield an annual interest upon "the investment, and the annual cost of keeping" of *forty per cent.* according to the reports of those who keep cattle in different parts of the State.

In nearly the whole State, cattle can be fed, in part at least, upon green food every month in the year, if proper attention is given to planting crops for their use.

VEGETATION, NATURAL AND CULTIVATED.

It is hardly necessary to say more under this head than to state that Georgia soil produces all the cereals, grasses and other forage plants, grown in the Northern and Middle States of the Union and some of great value, not grown in those sections, but in order that the capacity of our soil under high culture may be appreciated, a few instances of unusual production will be given, to illustrate the facilities for cheap feeding which our peculiar climate, soil and productions afford.

In 1873, Mr. R. H. Hardaway produced, on upland, in Thomas county, 119 bushels of corn on one acre.

In the same county, the same year, Capt. E. T. Davis produced $96\frac{1}{2}$ bushels of rust-proof oats per acre. After the oats were harvested he planted the same land in cotton and in the fall gathered 800 pounds of seed cotton." From this he got 18 pushels of cotton seed, making in all 114 bushels of excellent stock feed from one acre.

In 1874, Mr. Wiley W. Groover, of Brooks county, produced, with two horses, on a farm of $126\frac{1}{2}$ acres, without the use of commercial fertilizers, cotton, corn, oats, peas, sugar-cane and potatoes, to the value of \$3,258.25, of which \$2,213.25, were net profit. The stock raised on the farm were not counted in this estimate.

Mr. Joseph Hodges, of Brooks county, produced on one acre 2,700 pounds of seed cotton. From this he got, besides 900 pounds of lint cotton, 60 bushels of seed, which makes excellent stock food.

In Bulloch county, Mr. Samuel Groover produced on one acre, 3,500 pounds of seed cotton, or 1166 pounds of lint and 77 bushels of seed.

Mr. J. R. Respass, of Schley county, gathered in 1878, 500 bushels of oats on five acres of upland.

Mr. H. T. Peebles, of Berrien county, reports to this department 800 bushels of sweet potatoes gathered from one acre of pine upland.

In Wilkes county 123 bushels of corn were gathered from one acre of bottom land.

In the same county Mr. J. F. Madden produced in 1876, 137 bushels of oats on one acre.

Mr. R. M. Brooks, of Pike county, produced in 1873, 500 bushels of rice on five acres of bottom land.

Mr. R. B. Baxter, of Hancock, produced in 1872, 4,862 pounds of dry clover hay, on seven-eighths of an acre of upland at one cutting.

Dr. T. P. Janes, of Greene county, harvested in 1871, five tons of clover hay per acre, in one season, at two cuttings.

Mr. Patrick Long, of Bibb county, after harvesting from an acre a crop of cabbages, cut from the same ground, the same year, 8,646 pounds of native crab-grass hay.

Mr. S. W. Leak, in 1873, harvested 40 bushels of wheat from an acre, sowed the stubble in peas and harvested 10,726 pounds of pea-vine hay in the fall of the same year, from the same acre.

Mr. Edward Camp, of Coweta county, harvested 1,000 bushels of oats from ten acres.

Mr. J. T. Manley, of Spalding county, harvested 115 bushels of oats from one acre.

Mr. L. B. Willis, of Greene county, in June 1873 harvested, from one acre and one third, 20 bushels of wheat, and in October following, harvested from the same acre, 27,130 pounds of corn forage.

Dr. W. Moody, of Greene county, harvested at one cutting from one acre of river bottom, in 1874, 13,953 pounds of Bermuda grass hay.

Mr. J. R. Winters, of Cobb county, produced in 1873, from $1\frac{1}{2}$ acres, 6,575 pounds of dry clover hay, at the first cutting of the second year's crop.

Mr. T. H. Moore, of the same county, produced on one acre, 105 bushels of corn, and Mr. Jeremiah Daniel, 125 bushels.

Mr. R. Peters, Jr., of Gordon county, harvested in 1874, from three acres of Lucerne, four years old, fourteen tons and 200 pounds of hay, or 9,400 pounds per acre.

Mr. Thomas Smith, of Cherokee county, produced on one acre, 104 bushels of corn.

In Monroe county in 1879, 137 bushels of oats are reported gathered from one acre, by one farmer, and 56 bushels of wheat by another.

In Oconee county 106 bushels of oats from one acre are reported.

Similar instances of large yield might be given in greater numbers, but enough have been given to show the capacity of the soils of Georgia to produce in the greatest abundance, every variety of food for neat cattle.

Strangers from regions in which grain and stock are the principal market products, are impressed with the absence of sod fields, forgetting that the rearing of stock is a secondary consideration in all that portion of the South where cotton is cultivated as the staple money crop.

Wheat, rye, oats, barley, Indian corn, rice, all the grasses and leguminous plants grown in other parts of the Union, besides others peculiar to the South, the medicks, etc., grow profitably in Georgia.

Bermuda Grass, the bane of cotton fields, but a boon to the stock farm, makes a more impenetrable sod than the famous blue grass, and once well set, will afford pasturage inferior to none in nutritive qualities, for an indefinite period.

Small Grain, sown early in the fall, affords pasturage through the winter months, or may be repeatedly cut and

to cattle during the late fall, winter, and early spring months.

Lucerne, one of the most nutritious plants grown, may be cut from four to six times during one season, and once well set will last for thirty years, and perhaps longer, if properly cared for, Mr. Peters has a few acres in Gordon county, that were planted 24 years ago, from which he harvests several crops every year.

The Field-Pea, peculiarly a Southern forage plant, grows most luxuriantly on ordinary lands, and affords a superior provender for cattle.

The Millets thrive well, though not extensively cultivated, and give heavy yields of forage for soiling or hay for winter. The cat-tail millet has been cultivated for half a century in small patches, for feeding green during summer. It can be cut several times during the summer.

Sweet Potatoes, another crop peculiar to the South, yield immense crops per acre when well cultivated on sandy or sandy loam soils, as high as 800 bushels per acre having been reported to this Department.

Forage Corn affords an immense harvest of excellent provender at small cost.

Natural Pasturage is relied upon by the majority of the stock-owners of Georgia, and in many sections of the State it affords an abundant subsistence for cattle during the summer months. Where the river and creek bottoms are inclosed during the summer the grass and wild cane, which grows upon them, afford good winter pasturage for cattle. Where such are accessible in middle and southern Georgia dry cattle often pass the winter in good condition, without being fed at all.

Indeed the only difficulty in the way of profitable cattle-raising in Georgia, rests with the people, rather than with the climate and resources of the State. The climate is milder in winter, and not warmer in summer than that of those sections of the Union in which cattle are reared in

the largest number, and of the best quality. Expensive barns are not needed, and less provision is necessary, as regards food, to carry cattle through the winter.

The attention of the people has not been specially directed to stock-raising, and consequently the capacity of the State for cattle production has not been properly tested. the rearing of cattle has been merely incidental to other industries of the farm, which have been considered more important and profitable.

Again, the demand for the products of the pasture and the dairy has not been such as to stimulate attention to cattle, or justify farmers in making special investment of money with a view to production for market.

There can be no question as to the profit of better attention to cattle in Georgia, even if a domestic supply of beef, milk and butter, is the only object, but with the present means of transportation, our mild winter climate may be made available in supplying Northern markets with fresh yellow butter, made from fresh, green food.

The cattle of Georgia have enjoyed a most remarkable immunity from disease of every kind, an occasional case of red water being the only serious malady with which they are affected.

CHAPTER VI.

THE BEST BREED FOR GEORGIA.

This question cannot be answered definitely for the whole State, or for two farms, even, in the same neighborhood, without taking into consideration the circumstances of soil, probable attention to be bestowed, and the object had in view by the breeder. The best breed for any particular locality is that which under all the circumstances

will pay the owner the highest profit on the investment in money and labor.

There are so many factors to be considered in answering this inquiry, so often made, that the subject will be discussed from the various standpoints of farmers of Georgia surrounded by different circumstances of soil, climate, proximity to markets, etc.

No farm is complete without its milch cows. The question, therefore, is not whether cattle shall be kept on the farm, but what kind will pay best, and how much attention should be bestowed upon them. The first question to be considered is the use to be made of cattle, whether they are to be bred for beef or for the dairy, and if for the dairy, whether the produce is to be consumed in the form of milk or butter.

If milk is the object of the proprietor, and especial attention is to be given to providing suitable and abundant food, and proper care bestowed upon the cattle themselves, with a view to their improvement, a thorough bred bull of one of the milk breeds should be crossed upon well selected native cows, and upon their female offspring for several generations. Some will object to this plan of breeding the bull to his own offspring, but if they will read the history of some of the most noted herds of this country and England, their prejudices in this regard will be weakened if not removed. This, however, will be more fully discussed in the chapter on "The Principles of Breeding." Of course each individual must make his choice of breed to suit his soil, climate, pasturage, and the uses which he proposes to make of them.

If he proposes to raise thoroughbreds for sale, then the selection should be made of that breed which is most popular and hence will meet with the most ready sale. At present the Jerseys are the most popular and fashionable in Georgia.

The Ayrshire, Dutch, and Short Horn (of milking strain) make the best sources from which to cross the native cows, where large yield of milk is the object; the Ayrshire for any part of the State where a reasonable supply of provender is accessible; the Dutch or Short Horn where an abundant pasturage can be had.

The latter, being large animals, require a liberal bite of grass or abundant feeding to give good results.

The Devons and their grades answer a good purpose where a combination of beef, milk and butter is the object of the breeder.

If the sale of butter is the principal object, the Jerseys and their grades are unquestionably the most profitable. The thoroughbreds of all the breeds are too expensive to be used purely for farm purposes where the sale of their products, other than thoroughbred offspring, is relied upon for the income. When the sale of thoroughbreds, however, is the principal object, the sale of dairy products proves a material auxiliary in defraying expenses.

If little attention is to be given the cattle, and no special provision made for their support, good native cattle will probably prove more profitable than improved breeds, and may themselves be greatly improved by continual judicious selection.

If good attention, however, is to be bestowed upon the cattle and liberal provision made for their support, a cross of a thoroughbred bull of the breed suited to the surroundings and objects of the breeder, will materially improve the character of the offspring and increase the profits derived from the sale of their products.

Pertinacity in breeding is often more important than the first selection of a breed, if the farmer has a clear conception of what he needs and will practice an intelligent and judicious selection of breeding animals. It is too often the case that breeders cross their stock with such different breeds

as happen to be most convenient, regardless of the character of cattle they need, until the type of the offspring becomes as uncertain as a lottery, and their qualities as various as the sources from which they were derived. If an intelligent breeder will determine definitely the character of stock he needs, and select the offspring of each generation with reference to the use he intends to make of them, never using other than thoroughbred bulls, he can in a few years build up a herd equal, for farm or dairy purposes, to the thoroughbreds, and much less expensive.

If beef production is the leading object in view, two questions must be carefully considered in the outset, viz.: Can sufficient pasturage be provided for rearing the young cattle and fattening the beeves in summer, and enough grain and forage stored away each summer and fall to carry the young cattle through the winter in good condition, or stall-feed the beeves if the markets demand winter or spring beef.

The difference in the price of beef in winter and in summer will often justify the expense and trouble of fattening the animals on grain in the winter or early spring. Whether this will pay or not must be decided by each farmer for himself. But little of this has thus far been done in the South.

If abundant pasturage can be had for summer and forage for winter, the next question to be considered is, whether the grazier shall rear his own cattle or purchase them in a lean condition and fatten them on grain or grass, according to the circumstances which surround him. Graziers rarely rear all of their cattle on account of the necessity of keeping a large number of cows and young cattle constantly on hand in order to supply the desired number of beeves annually.

CHAPTER VII.

GENERAL PRINCIPLES OF BREEDING.

On this subject there is much difference of opinion among experienced breeders, especially as to the propriety of what is usually called in-and-in breeding. The following general principles are extracted from "American Cattle," by Allen, who is probably the best authority on the subject in hand on this continent. He gives the following rules for the guidance of beginners in the selection of a herd to start with. They should have—

1st. "Sound health, and freedom from constitutional, hereditary, chronic or local disease, blemish, or infirmity of any kind. And such sound health and freedom from any kind of *fixed* disease, should appertain to every young animal which is to be retained for breeding purposes thereafter.

2d. "As much perfection of form as may be possible to obtain in the breed, bearing in mind the chief uses for which the animals are intended.

3d. "That they possess the strong and marked characteristics of their breed, in the various points belonging to it.

4th. "That if of a distinct breed, the blood be thoroughly pure, and that purity be substantiated by well authenticated pedigrees, through as many generations back as can be ascertained.

5th. "Good temper, and a kindly, docile disposition in the animals so selected or reared for breeding or other purposes.

"To carry out these rules, an enumeration of certain points which all cattle, of any breed should possess, is necessary; among them are:

1st. "A fine head, small and clean.

2d. "A broad, full and deep chest, giving room for well developed and vigorous lungs to play.

3d. "Good length, breadth and soundness of body, roomy and full from shoulder to hip, with low flanks, thus giving room for abundant action of the viscera, or bowels, and expansion of the foetus, if a female.

4th. "Straight back, broad hips, and good length of loin.

5th. "Fineness of bone, and smoothness in the carcass generally."

These general, and we may say universal, requisites, are to be considered no matter what breed is adopted, or what use is to be made of the cattle, bearing in mind, however, the peculiar points and characteristics of the particular breed adopted.

"To the rules, and their subdivisions, here laid down, relating to the general figure of the animal, are to be added certain requisites to be supplied by the breeder, and of these may be named as indispensable :

1st. "Abundance of proper food in the various seasons, as grass, or its equivalent, in spring, summer and autumn; nutritious, well-cured and prepared food in winter; and plenty of good water *always*.

2d. "Regularity in feeding; no over-stuffing; no scantiness of allowance; but enough always without waste.

3d. "Shelter always when needed, according to temperature of climate and atmosphere; avoiding extreme cold, violent storms and excessive heats.

4th. "Kindly treatment; thus promoting docility in the animal; contentment of disposition, and a fearless confidence in its keeper—all promotive of quietude and thrift. Dumb beasts though they be, they appreciate good treatment much beyond what is usually supposed, and all these are indispensable to the successful efforts for the improvement or even retention of their good qualities."

The cattle-breeder must study nature, learn her laws, and direct his efforts at improvement in accordance with them, if he would attain success. Of these laws, none is more inexorable in its demands for consideration at the hands of the stock-breeder, or more potent in deciding the question of success or failure, than that which pervades all animated nature, animal as well as vegetable, viz. : "Like begets like." Without this, Agriculture in all its various departments, would be a deception and a snare, and all nature perpetually continue in a chaotic state. With this principle, however, as a guide, the stock-breeder need only exercise a sound judgment, guided by a close and careful observation to effect the most marked improvement in the character and type of his stock.

Whether the influence of this principle enures to the benefit or injury of the herd will depend upon the skill of the breeder in selecting and mating his breeding animals, so that good rather than bad qualities shall have prominence in the offspring.

Each breeder must decide upon the object to be attained in breeding cattle, select the breed that suits his purposes, and adhere to fixed principles in improving and developing the most profitable stock for his purposes.

If his object be to sell thoroughbreds, he must make a selection of the breed or breeds that will command the most ready sale and best suit the wants of his prospective customers, for if they do not suit the wants of his patrons, however fashionable they may be, his success will be temporary, and another who better understands the wants of the people will take his place.

In order to succeed in rearing thoroughbreds, the breeder must make judicious purchase of *registered* animals with good ancestral records, both as to pedigree and profitable yield of the peculiar product for which they are bred.

A proper nucleus being obtained, good attention, care-

ful selection and abundant food, will be necessary to success. The breeder must thoroughly acquaint himself with the general points of a good animal and especially with the type of the breed he keeps.

If his object be the sale of beef, his selections must be made for breeding purposes, of those animals which experience has taught are best adapted to his purpose, and provision must be made for an abundant supply of food for the rapid and full development of his animals.

The beef-producing breeds require full pastures or liberal feeding, without which success need not be expected.

When beef is the object, those animals must be selected for breeding purposes which promise the largest development of the most salable parts, combined with early maturity and capacity for liberal feeding.

If milk or butter is the object, selections for breeding purposes, must be made of one of those breeds which is noted for large yield of those products; and young animals which give promise of development into the dairy type, must be selected for propagating their species. Selection, however, must be made with good judgment, in order that good qualities may be not only propagated but increased in the offspring. The natural tendency of improved stock to retrograde, necessitates constant watchfulness on the part of breeders to counteract this tendency, by selecting for breeders those bulls and heifers which both by their ancestral record, and by their own points, promise to propagate good qualities in their offspring. It must be remembered that, in their natural state, cows give only enough milk to sustain their young for a few months, and that the present excess of yield over the wants of the calf, is the result of domestication, cultivation and selection. Turn them out to breed promiscuously among themselves, cease to stimulate milk production by abundant pastures, liberal feeding, and thorough milking, and deterioration com-

mences at once, and will continue until the original normal condition is reached. This is illustrated in the cattle on the range in southern Georgia where they are never milked. The yield of milk is only sufficient to sustain the calf, and with the exception of where improved bulls are occasionally introduced, the quality of the stock deteriorates into very inferior animals, small, slow to mature, homely and unprofitable. Yet these cattle may be steadily and surely improved by continued selection and good attention. This fact is shown by the good qualities of some of the cows which receive good attention from their calfhood. The breeder who gives the best

ATTENTION TO CALVES

will usually be most successful in building up his herd and maintaining it in an improved condition. Animals that are stunted in their growth when young, rarely recover entirely from its effects, no matter what be the subsequent care bestowed upon them. They should be kept in a growing condition from their birth, and not at any time, winter nor summer, stunted in food.

Their future usefulness and profit will depend in a large measure upon their treatment during calfhood.

IMPROVED BULLS.

The fact that "like produces like" is most forcibly illustrated in the use of thoroughbred bulls upon our native cows. The thoroughbred having a fixed, positive type and the power, from long breeding in a line, of transmitting his qualities to his offspring, and the female being destitute of any fixed power in this direction, the prepotency of the bull in such cases is most marked, and the improvement in a herd of native cows by the use of thoroughbred bulls is rapid and satisfactory. Indeed the half-bloods often equal in appearance and utility the thoroughbreds, but

breeders should not be induced by their fine appearance to rely upon them either for the improvement of their herds, or for sustaining improvements already made by the use of thoroughbreds.

The type of the sire, while showing prominently in the half-breeds, is not sufficiently fixed in them to enable them to transmit their good qualities with any degree of certainty. Grade males, therefore, should not be used when it is practicable to secure thoroughbreds. If, however, thoroughbreds can not be obtained, the next best that can be done is to use the best grade male that can be had.

Small males should be coupled with large females when crosses of different breeds are made. If the Jerseys or their grades are crossed with Short-Horns or their grades, the Jersey males should be used on the female Short Horn, and so with other breeds of different sizes; the males of the smaller on the females of the larger.

If large males are bred to small females, the drain upon the system of the small female to sustain the foetus, which will naturally partake of the size of the sire, will severely tax her digestive organs. Again, the capacity of the womb of the small female will not afford sufficient room for the full development of the large foetus, and deformity may result.

If such foetus is carried to maturity in small dams, the risk of death of the dam or calf, or of both, is imminent. In one herd, in which grade Ayrshire cows were crossed with a Short Horn bull, five cows died during parturition, and the calves had to be taken from others.

When small males are crossed upon large females, none of these difficulties are experienced.

The large feeding capacity of the dam, enables her to sustain, without extraordinary tax, the small foetus, she has ample uterine capacity for its full development, and no difficulty is experienced in its delivery.

PAMPERING OBJECTIONABLE.

While breeding animals should be kept in a thrifty condition from calfhood, extraordinary feeding or pampering is for many reasons objectionable. The tendency of over-feeding, is to induce constitutional weakness rather than vigor, and if carried to excess, often produces disease, especially if not continually and uniformly practiced when once begun.

It is especially objectionable in milking breeds, since the tendency to fat-production may be developed at the expense of milk-production.

The temptation to over-feed even breeding stock, when intended for sale, is almost irresistible, and may not be very objectionable in those intended exclusively for beef-production, if the young cattle receive similar treatment at the hands of purchasers. In the case of beef-breeds, the high feeding would probably have the tendency to develop the beef-producing capacity of the breed. Liberal feeding has been practiced by many of the most celebrated breeders, from Bakewell down to the present day, but pampering is seldom practiced by skillful breeders. Observation teaches that heifers and cows which are over-fed are not only less certain to breed than those kept in a good, thrifty condition, but that the calves from over-fatted dams, are smaller and less fully developed than from those in only good condition.

The opposite extreme however, is even more objectionable. Cows should be in good condition when they bear calves. If they are very poor at parturition, they will neither bring good calves nor afford a profitable yield of milk.

CROSS BREEDING,

Or the coupling of two thoroughbreds of different, distinct breeds seldom gives satisfactory results, since both sides

having the power of transmitting accurately their peculiar type, or both being positive in character, the type of neither parent is correctly represented in the offspring, but an uncertain blending of the two. The first cross sometimes gives good animals, but deterioration is rapid thereafter. It is generally better to cross thoroughbred bulls upon good common cows, and then if a mingling of pure blood is desired, make a second cross of the desired blood upon the grades resulting from the first cross.

Thoroughbred heifers of great value, should be bred from the first to bulls of the same breed, since the first male with whom they have connection *may* materially affect the character of their offspring, by other bulls. There are very striking instances of this influence on record, of which a few will be mentioned.

Alexander Harvey, physician and lecturer in the Royal Infirmary, at Aberdeen, Scotland, in a pamphlet "On a Remarkable Effect of Cross-Breeding," gives some striking illustrations of this fact from which only two will be given. "A pure Aberdeenshire heifer, was served with a pure Teeswater bull, by which she had a first-cross calf. The following season the same cow was served with a pure Aberdeenshire bull; the produce was a *cross* calf, which, when two years old, had very long horns, the parents being both polled. Again, a pure Aberdeenshire cow was served in 1845, with a cross bull, that is to say, an animal produced between a first-cross cow and a pure Teeswater bull. To this bull she had a cross calf. Next season she was served with a pure Aberdeenshire bull; the produce was quite a cross in shape and color." The same author mentions similar instances which occurred with mares, sows, dogs, pigs and sheep. These facts are mentioned in order that the owners of thoroughbred heifers of great value, from which they wish to breed thoroughbred animals of their kind, may avoid similar mistakes.

IN-AND-IN BREEDING.

On this subject Allen says: "This mode of breeding, to obtain certain results, has been practiced with all domestic animals—among quadrupeds, from the horse down to the rabbit—and with the feathered tribes, through all their varieties, from the swan to the canary bird. Such is the fact; and in support of it, numerous instances might be named, in breeding other animals than cattle, which are not now necessary to notice as we state the principle on which the practice has been adopted, and the successful results which have followed it."

The most noted breeders in this country and Europe have practiced close in-and-in breeding with the most satisfactory results, only going out of their own herds at long intervals for bulls. Allen says; "Bakewell did so with his Long Horns, through his whole course of cattle breeding, going only twice out of his own herd for a fresh bull, and then into the same family blood, at the distance of a few counties away, and no breeder of his time had better, if as good, cattle of the kind as he. Price, a noted breeder of Herefords, thirty years ago—no better in England—asserted that he had not gone out of his own herd for a bull for forty years, and at his final sale, when he gave up breeding, his cattle brought the highest prices—for Herefords—that had been known. The two brothers Colling, began breeding Short Horns, from the best cattle they could obtain from other breeders, about the year 1780. They soon got the bull Hubback, a thoroughbred of their own breed, and although they retained him only three years, they bred pertinaciously from his blood until the year 1810—thirty years—excepting only in Charles Colling's "alloy" family of the Galloway cross. Charles, in that year, sold out his stock at the highest prices ever known. His brother Robert so bred his stock—no "alloy" about them—until 1818—thirty-eight years—when he sold out

at prices larger than any other Short Horn herd would sell for at the time. * * *

“Their stock stood in the very highest repute, and no men had bred so intensely in-and-in, by every possible intermixture, as they, adhering to their old blood to the last. Charles, in some instances, bred his bull “Favorite,” to his own dam, and sister, and granddaughters, and so down for four or five generations.

“So also bred Mr. Bates, who bought his first “Duchess” deeply bred in-and-in, of Charles Colling, in the year 1804. He bred her and her near relations together, all closely allied in blood, and never went out of his own herd for a bull, with any success, as he frequently asserted, until the year 1831, when he obtained the bull “Belvedere,” of the same blood, in another herd. He also introduced into his herd, the “Matchem cow,” an animal showing excellent points of character, a stranger to his own stock, but which he contended had a back-cross of his favorite blood in her, and thus possessing good quality, with which to reinvigorate the energies of his deeply in-and-in bred stock. He crossed his best bulls on that cow, and then interbred her produce with others of his old blood, and adhered to that blood thus crossed, and still further interbred, for the remainder of his life. Mr. Bates died in 1849, and for more than fifty years, was a Short Horn breeder.

“So, also, bred the Booth brothers, John and Richard, long time breeders of great celebrity, and their stock still remains in high repute, both in England and America. They bred deeply in-and-in. So did the Wetherells, Mason, Wright, Trotter, Charge, Earl Spencer, Sir Charles Knightley, and other noted breeders of their day, although we know less of their particular breeding, only as we trace them through the early herd-books, than of the Collings and Bates. All these herds were of high reputation, and their blood, passing since through the hands of other

breeders, is now widely, by importation, scattered over the United States, and the Canadas. * * Every *improved* race of cattle in Britain has been more or less so in-and-in-bred, Devons, Herefords, Long Horns, Ayrshires, Highlanders, Galloways, Alderneys, and the famous 'Dutch' cows of Holland. It was indispensable so to do, to concentrate their good qualities, until a standard of excellence had been attained, from which the breeders could strike out into more divergent blood."

"Thus; the fact that in-and-in breeding, of itself, having a tendency to deteriorate the quality of the produce, is shown to be fallacious, so far as *those* breeders were concerned; the *manner* of doing so is quite another thing. Interbreeding in such close relation, is a nice—possibly a hazardous—thing, and can only be practiced by experienced men who are good physiologists, have a just appreciation of both the good and indifferent qualities which their cattle possess, and the knowledge *how* to couple them together, to produce favorable results. The great merits and object claimed for in-and-in breeding, is the *concentration* of good blood in the animal so bred, enabling him or her to transmit that blood strongly, not only in the herd where they originated, but in other herds to which they may be removed. We do not, in fact, believe that many who object to the so-called in-and-in practice of breeding, really appreciate their own course of practice, while they are constantly pursuing that which they condemn."

Those who practice in-and-in breeding, should bear constantly in mind the fact that while it is the most expeditious method of intensifying good points, bad qualities are also propagated and intensified by the same practice, and hence, unless the utmost care is exercised in the selection of animals near of kin to be coupled together, constitutional defects will be intensified to the serious injury of the herd.

It must be remembered, also, that bad qualities, thus intensified, are not easily removed by subsequent breeding.

To illustrate: If a male and female of very close kin, each having the same defect, are coupled together, the tendency of both being to transmit this particular quality, it will be materially increased in the produce.

If the defect is an external one, which may be readily seen, it may be avoided in the selection of animals to be coupled, but if the defect is in the heart or lungs, such organic defects may be seriously intensified before they are discovered.

Once established by such breeding, it is no easy matter to ever eradicate them, even with the most careful selection, made by the best and most experienced judge of cattle.

Hence, while in-and-in breeding is perhaps the surest means of rapidly improving a given herd, under careful selection by an experienced breeder, it is by no means a safe, but is even a hazardous, practice for beginners, or the inexperienced.

The principles to be observed in breeding under any other circumstances, apply to in-and-in breeding, but their application in the latter case requires more accurate knowledge of the subject, and much greater skill in selecting breeding animals.

If it is desired to propagate any particular good quality, the male and female to be coupled should possess this quality well developed, and if it is desired to rapidly intensify it in the produce, animals closely related and possessing the desired quality should be selected. Care, however, should be used to avoid, in such selection, animals having bad qualities highly developed, since the principle that "like begets like" applies as well to the transmission of bad as of good qualities.

The first thing to be considered in the selection of breeding animals is soundness of constitution, without which no animal, whether male or female, should be allowed to propagate its kind. The next in importance is the form

and peculiar points characteristic of the particular breed in use.

In ordinary breeding, it is of great importance that the animals selected for breeding purposes shall have good qualities well developed, and be as free as possible from defects. This is important in the females as they exert probably an equal influence with the male upon their individual offspring; but the character of the bull is of greater importance than that of the cow in proportion to the number of cows served by him. To illustrate: A cow can affect the character of only one calf a year, while a bull may stamp his characteristics upon an hundred in a single year, if his resources are properly husbanded and judiciously directed. One perfect service by a vigorous bull is as effectual as a dozen and often more so.

Now if the bull has any organic defect he is liable to transmit it to each one of his produce, and if subsequently coupled with his own offspring, the defect will be intensified by transmission from both dam and sire. The necessity for the utmost care in the selection of the bull when in-and-in breeding is practiced will, therefore, be readily understood.

The prejudice which exists in the minds of many persons against what they call incestuous breeding, is based largely upon their preconceived ideas in regard to the intermarriage of close blood relations in our own species. There is little analogy, however, in this regard between man and other animals. There is no such thing as incest in the brute creation. "They have no *family* affections or sympathies, no permanent likes or dislikes, after the mother has weaned her young, and it has become able to provide for itself. The female, when in heat, freely receives the male, comely or uncomely, no matter what, if of her own kind; and the male, with the same ungovernable propensity, seeks his gratification with her. Blood relation

among themselves amounts to nothing, even if they had the capacity to *think* of it, which they have not. The indulgence of their lust is the sole object of their desire, and that is effected regardless of consequences."

The conclusions, therefore, are:

1. There is nothing wrong or improper in in-and-in breeding among stock.

2. It is a dangerous practice except in the hands of experienced and skillful breeders.

3. It has been in such hands a most potent agency in building up the best breeds of cattle now known.

4. It is the most expeditious method of establishing in any given breed a desired type, under judicious selection of breeding animals.

5. Promiscuous in-and-in breeding, without the most careful and skillful selection of both sire and dam, will result in degeneration both in form and constitution.

CHAPTER VIII.

GRADING UP NATIVES.

Before discussing the subject it is important to understand exactly what is meant by the term "native."

In the ordinary meaning of the term there are of course no native cattle in America, since, previous to its discovery by the Caucasian race, there were no cattle on this continent.

All cattle which not only do not belong to any distinct breed, but cannot be traced to any such breed, are classed, by way of distinction, as "natives." Thus understood, there is no impropriety in the use of the term "native" to designate the common cattle of the country. They con-

stitute a large majority of the cattle of this country, and among them we often find individual specimens of marked excellence.

They must form the basis of improvement in our herds, whether that improvement be made by the slow process of selecting the best specimens of the natives, male and female, for breeding purposes, or whether pure-bred bulls be used upon native cows.

The natives, having no fixed hereditary type, cannot be relied upon to perpetuate their good qualities in their offspring, but having strong constitutions, the native cows afford an admirable basis upon which to build, by the use of thoroughbred bulls of those breeds which are suited to our climate and pasturage.

The farmer who proposes to grade up his stock, should first consider well which one of the pure breeds will best suit his purposes, and, after once making his selection, adhere to that particular breed, using only thoroughbred bulls on both native and grade cows. There are cases in which it is advantageous to cross the grades with a new breed to accomplish a particular end, as, for instance, the cross of a Jersey bull upon grade Ayrshire or Short Horn cows, that are very deep milkers, with a view to an increase in the production of butter; but, as a general rule, it is better to adhere to one breed and grade up to a high standard, combining the constitution of the native with the hereditary good qualities of the pure breed.

The thoroughbred to be employed will depend of course upon the use that is to be made of the cattle. This each breeder must determine according to his surroundings and proximity to market. In any event, however, he must determine to give good attention to his stock, since the use of thoroughbred bulls alone, without abundant food and good attention, will not secure the full benefit of the cross.

Good attention and abundant food are indispensable requisites to improvement in stock, and not only this, for without them *deterioration is inevitable*.

With the exception of those sections in which cattle are turned out on the "range," the production of milk and butter is the leading object of the owners of cattle in Georgia, and hence in the selection of bulls with which to grade up the natives, choice will generally be made from either the Jersey or Ayrshire—the former if the sale of *butter* is the object, and especial care is to be taken with the stock; the latter if *quantity* of milk is the object, and reasonable care given.

The Short Horn of *milking strain* will meet the latter requirements, in those sections of the State where the grasses are cultivated and abundant pasturage is available, but are not suited to Georgia generally, at present, on account of deficient pasturage. The Short Horns require on account of their size, more liberal feeding than the smaller breeds.

If combination animals are sought the Devon cross will probably give satisfactory results.

Whether resort is had to pure breeds or not, heifers for breeding purposes should be selected with reference to future usefulness for the purpose for which they are bred. If intended for milch cows, then those having the characteristic form and other marks indicative of future usefulness at the pail should be selected. If intended for beef, or for rearing beef animals, then those giving promise of the greater development of flesh at the least cost are to be selected. There is generally too little attention paid to the selection of breeding animals with direct reference to the use to be made of them.

CHAPTER IX.

MANAGEMENT OF CALVES—SELECTION OF HEIFERS
AND BULLS.

Every true breeder appreciates the importance of proper attention to calves, and the influence of early treatment upon their future usefulness; unfortunately, however, calves receive but little attention at the hands of the majority of our farmers, and too often become seriously stunted in their growth by neglectful treatment and insufficient food while they are young, preventing full development and usefulness, whether they are intended to supply the dairy or the shambles.

Few exercise any control over the time at which their cows drop their calves, allowing the bull constant companionship with the cows, and consequently having them coming in at all seasons of the year, regardless of their own convenience and profit, or the usefulness of the cow or the offspring.

There are various considerations which should control the owner of cattle in determining the time at which his calves should be dropped, the chief among which is the use to be made of both dam and calf.

If the rearing of stock for beef or sale as thoroughbreds or for the dairy is the object chiefly had in view, the spring is, beyond question, the best time, under ordinary circumstances, to have calves dropped, for the following obvious reasons :

1. If they are dropped in spring after the grass has put forth, the cows, having succulent green food, afford an abundant supply of milk to give the calves a good start-off, and as soon as old enough, they have the advantage of

tender pasturage—natural food, upon which they will continue to thrive, and be in good condition to withstand the winter. The cows being in a healthy, thriving condition will naturally impart health and thrift to their offspring. It is important, however, that the cows be kept in good condition during the winter preceding their parturition, that the foetus may be fully developed. If cows are allowed to become very poor during winter, as is too often the case on our farms, the foetus will be dwarfed and enfeebled by the defective nutrition derived from the dam.

2. The cost of keeping both cow and calf will be less when both have the run of pastures, than if required to be fed, as they would be if the calves are dropped in the fall. If dropped in summer, the calves go into winter quarters so young that their growth will receive a serious check during the winter, unless more care is given them than is usually bestowed in Georgia.

A young animal never entirely recovers from the effects of such severe check to its growth as calves usually receive from neglect and insufficient food during winter.

Good shelters and abundant food are, even in our mild winters, necessary for young calves, to prevent serious and irreparable injury resulting from a check in their growth, from the want of these.

Green food, in the form of pastures of rye, barley, or oats, should invariably be supplied for calves passing their first winter. This may be done in any part of Georgia by sowing the small grain early in the fall. Dry food, however sweet, will not answer so well for them as green pastures.

REARING BY HAND.

Since this method requires much care and personal attention, it is not likely to be adopted generally in Georgia, but for the benefit of those who are willing to take the necessary trouble, detailed instructions are given em-

bracing the practice of the best and most successful breeders. The most approved plan is to allow the calf to fill itself once by sucking its mother, and then remove it, if possible, so far from its dam that she cannot hear its bleatings. When it has become quite hungry, teach it to drink the warm milk, freshly drawn from its mother, as follows: Back the calf into a corner, place its head between the knees with a pail of warm milk in front. Moisten the finger in the warm milk and induce the calf to suck it, pressing the head down at the same time and immersing the finger in the milk. The calf continuing to suck will draw the milk from the pail, and if the finger is gradually withdrawn, will learn to drink. This done, no further trouble will be experienced.

Mr. Frank White, an eminently practical and successful farmer, of Hancock county, Georgia, wrote in the May number of *Southern Enterprise*, 1879, as follows:

“*Management of the Calves.*—When the calves are dropped I let them remain with their mothers until dry, and allow them to fill themselves once with milk. Then I remove them from the cow, so that they can neither see nor hear each other. In about twelve hours, or as soon as the calf gets hungry, I have the cow milked and carry the warm milk to the calf. First get it to draw the finger, and, while doing so, hold the finger in the milk, or for the first time feed with a spoon as he draws the finger.

“It only requires a day or two to teach them to drink from the bucket. I feed them their mother’s milk for five or six days, and then give them skimmed milk, that is not sour, prepared as follows: Take a tablespoonful of sifted meal and pour over one quart of boiling water, and add sweet skimmed milk until the mixture is milk-warm. I feed this for four or five weeks, and then give sour milk or clabber, but always scalding the meal with boiling water, adding more meal as the calf gets older.

"I have never lost a calf under this treatment, and raise them much finer than by the old method of letting them suck their mothers. Besides, they all soon become pets, and run for the boy who feeds them whenever they see him with a bucket in his hand. It is better also for the cows. They give more milk, which is all saved for use, and they are more quiet and much less trouble to manage. The calves too, being handled while young, make gentle, good cows.

"When the calves are weaned from the bucket the precaution must be used to have either good, tender grass to turn them on, or have green, succulent food to give them, that they may not be checked in their growth."

The advantages of this method of rearing calves, if proper attention is given them, are very great, and the trouble is no more than that accompanying the old plan of allowing them to suck their mothers, while both the calves and the mothers do better under the former plan.

Apart from the relief from the annoyance of having the calf to nurse its mother at each milking, the increased yield of milk for dairy purposes is ample compensation for the trouble and expense of feeding the calf.

Besides, heifers raised by hand make better milkers on account of the docility acquired by being handled while young. All who have had much experience with milch cows, appreciate the importance of having them gentle when they come to the pail. There is no other plan by which this can be more surely accomplished than by rearing by hand or from the pail.

In a large part of Georgia, especially in the wire-grass and mountain region, this plan is, of course, impracticable, since there the calves run with their mothers on the range, where they are seldom even seen by their owners, and the calves allowed to take all the milk.

If proper provision is made for wintering the cows and

calves; if good warm shelters are provided, sufficient to protect them from cold rains and winds, and a liberal area sown in small grain to supply green pastures, or green cut-food, during the late fall, winter, and early spring, taking the mildness of our climate into consideration, calves dropped in the fall may be made to do quite as well as those dropped in the spring. This, however, will necessitate better provision for them and more attention than is generally made or bestowed in Georgia.

If, however, farmers will provide suitable shelter and abundant winter pastures, so that the calves may go upon grass in the spring in good thrifty condition, there is no reason why a large proportion of the calves may not be dropped in the fall.

Besides this, the price of dairy products being higher in winter than summer, if pastures are provided for the cows also, the annual profits of the dairy may be materially increased by having the most of the cows come in during the fall. This branch of the subject will be more fully discussed in the chapter on the Dairy.

SELECTING BULL CALVES.

When the fact that the bull impresses his peculiar characteristics upon such a large number of calves, is considered, the importance of selecting the best specimens for the purpose of propagating their kind, will be appreciated.

While not even the most experienced and practiced eye can foresee what will be the development of any particular calf, some idea may be formed, however, of the character of the future bull from that of the calf.

The selection should be controlled by the use to be made of the offspring of the animal.

If the bull is to be used in a dairy herd, selection should be made of a calf from a line of cows having a good milk record. It will not be enough that his immediate dam

shall have been remarkable for milk production, since that may have been accidental; but it must have been a fixed characteristic of his female ancestry, and he will be the more certain to give satisfaction if his sire was noted for getting good dairy stock. The calf himself should not have the heavy points peculiar to his sex too prominently developed, but should have evidences of a strong constitution and good digestive organs.

After the selection is made, such attention should be given as will insure continuous thrifty growth without over-feeding or pampering.

If beef-production is the leading object had in view, a different type of calf should be selected, giving promise of greater size, more muscular development, and a greater tendency to take on flesh. Constitutional vigor is a necessary requisite in any animal selected for the purpose of propagating its species, no matter to what use its offspring are to be devoted.

As has been already remarked, selection may improve the common cattle, but there is no certainty of the transmission of their good qualities. Without selection, any herd, no matter how carefully it has been bred in the past, will rapidly deteriorate.

CHAPTER X.

MANAGEMENT OF MILCH COWS—THE RELATION OF THE COW TO CIVILIZATION.

Like the Irish cottager's pig, the cow is almost a member of the family, so close is her relation to their daily support, and her usefulness will be proportionate to the care, kindness, and intelligent attention bestowed upon her. There is no other animal which contributes in so

many and in such important respects to the comfort and happiness of man. Cattle contribute in more ways to production, consumption, and manufactures than any other domestic animal.

Oxen contribute their labor to man's assistance, and when too old to serve in this capacity, they are still as valuable as ever, if made fat, to contribute their flesh for food, and other products to manufactures. Cattle contribute to man's use beef, butter, cheese, milk in various forms, and tallow; their hides, converted into leather, shoe the human race, their horns are largely used in manufactures, and with the hoofs furnish an inferior source of nitrogen; their bones furnish to commerce phosphoric acid and nitrogen; the dried blood from the slaughter-houses furnishes an important source of nitrogen to the manufacturers of commercial fertilizers; their hair is used in the manufacture of some coarse fabrics and by plasterers to increase the cohesive power of their mortar. Every farmer fully appreciates the value of their manure; indeed, in some of the countries of Europe the graziers and feeders of beet cattle consider the manure from their fat cattle a reasonable compensation for the expense and trouble of feeding. Much of the gelatine of commerce is made from the hides and feet of cattle, and especially from those of calves.

It will be seen, therefore, that no other animal yields so many or such valuable contributions to the necessities and comforts of the human family.

This being true, it is not unreasonable to demand for cattle generally such care and attention as will increase their power of contributing to man's wants. Such care, though prompted by the plainest dictates of self-interest, is seldom bestowed by the Southern farmer. It is even rare that the

MILCH COW

receives such attention as to secure her maximum usefulness, notwithstanding the fact that she reminds her owner

of her wants, as well as of her usefulness, by her daily contributions to his table.

If this chapter shall induce the owners of cows in Georgia to bestow better attention upon these useful animals, its object will have been accomplished; the farmers of the State will enjoy increased comfort, pleasure, and profit, the Commonwealth will have better and happier citizens, and will receive, through increased revenue from the enhanced value of live stock, more than enough annually to pay the cost of this Manual. There are about 300,000 milch cows in Georgia. By judicious selection, good feeding, and proper care, an average increase of one quart in the daily yield of milk per cow may be effected beyond all question, and, in many instances, an increase of four quarts will result. An increase, however, of one quart per day for four months would be 120 quarts per cow per annum, or 30 gallons per cow each year. For the 300,000 cows, this would give an increase of 9,000,000 gallons, which at an average price of ten cents per gallon (it retails in Atlanta at 40 cents per gallon) would give an aggregate increase in the value of the milk product of the State of \$900,000.00 a year, or \$3.00 per cow.

There are in the State about 500,000 cattle, other than milch cows, whose value would be increased by better care, at a very low estimate, \$1.00 per head, or in the aggregate \$500,000. These are low estimates, easily realized, and yet they figure up for the State nearly a million and a-half dollars. It is safe to say that with proper care the additional manure saved would be worth to the State \$100,000.

Every one, who has observed such matters at all, has noticed the superiority of the cows about the villages and cities over those of the country, owing mainly to the better attention given them.

The same difference is seen in the country on adjacent farms with equal facilities for rearing stock, the difference

in results and profits being entirely due to better attention on one than on the other, to selection, food, shelter, and general care of the cows.

The questions of breed and breeding having been discussed in other chapters, they will be introduced here only so far as may be necessary to elucidate the subject in hand. The discussion, too, will be applicable only to such cows as are bred and kept for their milk, and not to those that are kept solely for the purpose of rearing calves, as is the case "on the range" in Southern Georgia.

ON THE SELECTION AND MANAGEMENT OF HEIFER CALVES

Will depend, in a considerable degree, the success with dairy cows. Although native, or low grade cattle have not the power of transmitting, with certainty their good qualities, other things being equal, it is well to give preference to calves out of the best milkers, though attention should be given to form and other peculiarities which give promise of usefulness at the pail. Among these are the color of the skin, breadth of hips, taper of neck and head, large stomach, development of the "escutcheon," or "milk mirror" (discussed in another chapter), and general *feminine* appearance, as distinguished from masculine and beefy characteristics.

Those which make the most rapid growth, and take on flesh most kindly are not necessarily the ones to be selected as the future milch cows, but on the contrary, unless possessing other indications of future usefulness at the pail, are to be rejected. Other things being equal, cows of gentle, quiet disposition, give best results at the pail, and hence calves should be subjected to gentle and kind treatment while young, and, where practicable, accustomed to the halter while young and easily managed.

They should be kept in a thrifty, growing condition, without pampering on the one hand, or neglect on the

other. If pampered, there is risk of impairing their health, while neglect, and the resulting check in growth, will reduce the size of the animal, delay breeding, and thus postpone the commencement of their usefulness, and diminish the profit derived from them.

The age at which they should be allowed to breed will depend upon the breed, the use to be made of them—some breeds being habitually more precocious than others—and upon the keep and thrift of the individual. As a general principle, if the owner has no preference as to the season of the year in which the calves are to be dropped, it is well to let natural causes control the time at which heifers will commence to breed, provided they have abundant food and good attention, both during the period of gestation and while rearing the first calf. Under natural circumstances they will seldom commence to breed too early for their own proper development, or the profit of their owners.

Early breeding is desirable, if the heifers are so well fed, or have access to such pasturage, as will prevent a serious check to their growth, since the early exercise of their milk-producing powers, while yet growing, will more fully develop these powers, and establish the habit while still impressible.

Nature indicates by the desire for the male on the part of heifers the earliest period at which they can commence to breed. If milk is the object in view, this impulse need not be restrained, except to control the time of parturition.

THE AVERAGE PERIOD OF GESTATION, 284 DAYS.

This varies with individuals, but calculations should be based on the average, and the male admitted as nearly as the natural periods of desire (which occur about every twenty-one days), will admit, that length of time before it is desired to have the calf dropped.

One or two connections with the male will be as effectual as more, if the cow is removed from the annoyance of other cattle until her passion passes off.

Our native cattle that are well treated and supplied with abundant food from calf-hood, will usually, if left to their natural instincts, drop calves when from two to three years of age. The Jerseys, unless restrained, usually bear at a much earlier age than any other breed, many of them dropping calves at the age of 15 to 18 months. In Southern Georgia, where cattle use upon "the range," without attention, they usually do not commence to breed until more than two years of age, and often not until they are three or more years old. If beef animals are to be reared heifers should be well grown before commencing to breed, but there are several material advantages in having those intended for the dairy commence breeding early. The heifer that commences to breed very young has her milk-producing faculties more fully developed than one that does not commence until her growth is fully attained. One that drops a calf at two years old commences one year earlier to return profits to her owner than one that drops one at three years of age, reaches the period of greatest usefulness earlier, will usually, other things being equal, make a more docile and profitable cow; and, as far as observation goes, continue profitable at the pail to an equally advanced age.

TREATMENT BEFORE CALVING.

No special attention is necessary during pregnancy, except to keep the cow in a healthy, thrifty condition, until a week or two previous to calving, when stimulating food should be withheld for a week or two previous to the time when the record, if one is kept, shows the calf is due. If no record of the date of service by the male has been kept, the springing of the udder will indicate the approach of

parturition. If there is such an accumulation of milk in the udder before calving as to cause risk of fever, or garget, a sufficient quantity of milk should be drawn daily to relieve the distention and remove all danger of inflammation or caking of the udder. There is a very general impression that drawing the milk before calving causes serious injury to the calf, since the first milk is (correctly) supposed to have medicinal properties beneficial to the calf. Experience, however, of the best and most careful breeders has demonstrated that no injury results to the calf from such a course, while the safety of the cow, especially if a deep milker, often demands it. Besides, all of the milk is not taken at any one time before calving, so that the calf is in fact not deprived of the benefits of the first milk. If cows are properly fed before calving, on food moderately laxative, or have the run of pasture, not one in a thousand will experience any difficulty in calving. Heifers with their first calf are more liable to be troubled with caked bag, or garget than older cows, and deep mikers are more subject to it than poor ones.

Close attention, however, should be given to all cows for a few days before and after calving, but there should be no interference with nature unless absolutely necessary, and then nature's process should be *aided, not forced*. Drawing a portion of the milk before calving will usually prevent all danger of injury to the bag. The milk, however, will not always flow, though the udder is distended and hard. In speaking of such cases, Allen says: "A washing of salt and water, weak soap-suds, or bathing in water alone is good. An ointment of camphor, mixed with cream or hog's lard, or fresh butter, may be used, well rubbed in by hand all over the udder and teats. These failing, a sack or woolen cloth—part of an old blanket or carpet—may be made large enough to enclose the udder and forward along the belly, and in rear up into the

twist, secured by strapping it over her back. This sack should then be kept thoroughly saturated with mildly warm water, which may quite relieve her difficulty, when the washes and ointments fail."

Mr. Peters uses in such cases hog's lard and arnica. He says, in "Southern Enterprise," "Melt the lard and pour in the arnica, equal quantities of each—rub the cow's bag with this three times a day." He has used this repeatedly with most satisfactory results. If cows are properly managed before calving, however, they will usually pass through parturition safely, and without assistance from the keeper. When the calf is dropped the dam should be allowed to follow her natural instincts, and lick it dry. This removes the slimy coatings, and her breath warms the new-comer, who is soon able to stand and find the teat, which it does instinctively. As soon as the calf has sucked all it needs, the udder of the cow should be milked to emptiness. A warm bran mash, diluted with blood-warm water, so that it may be drank, should be given at the first milking, and if the cow appears much weakened by the trying ordeal through which she has passed, this may be repeated for several days until she gives evidence of restored strength. The udder should be entirely emptied twice a day, and as soon as all fever has subsided the quantity of food should be increased, or free access to pasture allowed. If the placenta is voided promptly, as it will usually be by a healthy cow, it should be immediately removed and buried. If a portion of it remains hanging in the vulva, as it will often do in cows in low condition, no violence should be used in removing it, but a laxative drink, such as boiled flax-seed, salts or meal gruel should be given. Only in exceptional cases, however, will more than ordinary prudence and care be necessary. The quantity and strength of the food given should be gradually increased, using care never to give more than will be consumed with a relish. If

given in excess the appetite will be cloyed, and a reduction in the flow of milk, if not sickness, result.

Animals, like men, prefer a varied diet, and thrive better on a variety of food, even if not so rich, than upon the same rations day after day. A cow turned into a pasture, in which there is variety, will not confine herself to any one plant, but will partake of the grasses, clover and weeds apparently with equal relish, and will consume much more in consequence of the variety. In the spring, when vegetation is very succulent, a little corn meal and wheat bran, one part by measure of the former to two of the latter, given twice daily, will conduce to both health and profit.

Gentle treatment of milch cows is of much greater importance than is generally understood by owners of cattle. Cows should never be struck nor scolded while being milked. A full flow of healthy milk need not be expected from cows that are excited to fear by ill treatment. The utmost gentleness, kindness and quiet should be exercised by the milkers.

Punctuality as to the time of feeding and milking is also important. Cows acquire habits and become restless if not fed or milked at the hour at which they expect it. Quiet, contentment and regularity of habit are necessary to secure the maximum yield of either beef or milk.

Thorough milking is another essential to success in dairying. It will be in vain to secure fine stock and feed liberally if the milking is not thoroughly and regularly done. Milk left in the udder will either be re-absorbed, or become caked and injure the bag. In either case a reduction in the flow of milk results. In all cases where cows are driven to the lot to be milked, each should have her stall under a shelter, close overhead, but well ventilated at the sides. A little meal and bran should be placed in a tub or trough in each stall before the cows are turned in. Each

cow will soon learn to go quietly to her stall, where she should be at once secured by a rope or stanchel. The rations of meal will not only induce the cows to go willingly to their stalls, but will increase the flow, improve the quality of the milk and prevent scouring, so common when cattle feed entirely upon grass.

Cleanliness, both in the management of the cows and in milking, should be scrupulously observed. The stalls should be kept clean and free from all offensive odors, and the milker should be provided with water and a cloth with which to thoroughly cleanse the udder and teats before milking. No matter what one's fondness for milk, his stomach would naturally revolt against drinking that drawn from a cow whose sides are caked with manure, or whose escutcheon is coated with ticks, and yet how often do we see cows in one or the other condition.

The treatment of milk subsequent to drawing from the udder will be noticed under the chapter on "Milking and Management of the Milk." Young cows with their first calves require especial attention. They are then in a formative stage, so far as the development of their milk-producing capacity is concerned, and should receive that treatment which will best conduce to such development. They should be well fed, thoroughly milked, kindly and gently handled, and kept at the pail as long as practicable to acquire proper habits. If they have been accustomed to the halter from calfhood there will be but little difficulty, either in their management, or in establishing such habits as will render them useful animals during the remainder of their lives.

A mistake very common in the South is keeping more cows than can be properly cared for. Cattle poorly fed and cared for are seldom profitable, while there is no animal which gives a more profitable return for food and attention than a good cow.

The following schedule of values, graded according to the yield of milk, will be suggestive to those farmers who keep large herds of inferior cattle. If cows are kept for their milk, and valued solely on account of their yield in this respect, one that yields one gallon of milk daily is worth about \$10.00, less than her value as beef when fat, if of ordinary size. One that will yield two gallons daily will be worth \$20.00, three gallons \$45.00, four gallons, \$75.00, five gallons \$120.00, and six gallons \$200.00. This may seem at the first glance somewhat arbitrary, but when reduced to a calculation will be found to be based on sound reason. It will require the same outlay for food, the same attention, and the same house-room for the cow whose capacity is one gallon as for one yielding six gallons per day. The one gallon cow will not pay for her food and attention unless she runs on the commons during summer and in the swamp in winter. If one gallon is the limit of her milking capacity, extra feeding will only improve her condition as a beef animal, and the sooner she is converted into beef, the better for her owner. Ordinarily one good cow, well fed and cared for, will not only prove more profitable to her owner than three inferior ones poorly fed and cared for, but yield as much milk in quantity and of far better quality.

FEEDING THE COWS.

A milch cow should be regarded as a complicated piece of animated machinery peculiarly adapted for supplying food for man, and dependent upon him to a large extent for the food necessary to insure her maximum usefulness. It should be remembered that the cow, in her natural state, yields only enough milk to supply the calf, and that for only a few months, until its stomach is prepared to digest the natural food of adult cattle. The large yield of milk gotten from cows is due to the effects of domestication,

care and selection. The modern cow is in an abnormal condition produced by man's skill, from which there is a constant tendency to return or deteriorate to the normal state. To maintain, therefore, the vantage ground now occupied, the exercise of the same skill that has been used in the improvement must be exercised in its perpetuation. The best herd in America, turned out on the commons to eke out a bare livelihood, will rapidly degenerate into mere scrubs inferior to the common native cattle of the country, which have more vigorous constitutions and are better able from habit to endure neglect.

The fact that both the quantity and quality of milk are influenced by the abundance and character of the food consumed by cows, is well known to every one who has ever owned a cow; but very few make the most profitable use of such information.

Numerous instances have been brought to the notice of the writer, in which the owners of valuable cows, desirous of rapidly increasing the flow and improving the quality of the milk, have defeated their object and injured their cows by ignorance of the character of their stomachs.

The cow has four stomachs: The first and largest, the *rumen*, or "paunch," into which the food is deposited when first swallowed with very little mastication, is the largest, and occupies the larger portion of the abdominal cavity. The food, after passing through this cavity and into the *reticulum* or second stomach, remains until the animal has a period of rest, when rumination, commonly called "chewing the cud," commences. The *æso-phagus* gullet or duct leading from the pharynx to the upper orifice of the stomach, has an opening into each stomach. Solid food, however, when first swallowed, invariably passes into the *rumen* or paunch in which it is passed around through its different compartments, and finally forced, by combined peristaltic and spasmodic action, a pellet at a

time, into the second stomach or *reticulum*, whence the pellets are, by a contraction of the *reticulum*, forced again up the *æsophagus* into the mouth for more thorough mastication. This done it is swallowed, and being now softer and more pliant, passes down to the *manyplus*, or third stomach, in which it is still further comminuted and reduced to a pulpy mass, when it is passed on to the fourth stomach, or *abomasum*, in which the process of digestion proper takes place under the agency of the *gastric juice*, which converts the food thus prepared by the first three stomachs into a fluid called chyme. Thus reduced to a solution the food passes through the *pyloric*, or lower orifice of the stomach, into the first intestine or *duodenum* "where its separation into the nutritive and innutritive portions is effected and the former begins to be taken up and carried into the system."

Now if a cow is fed too exclusively upon concentrated food the *rumen* or first stomach is not sufficiently distended for healthy peristaltic action, and the food is passed through without proper and thorough digestion. The cow, as well as other ruminants, is supplied with the *rumen* or large receptacle for the purpose of storing and preparing large quantities of "roughness" and should be fed in accordance with these indications of nature. The natural food of the cow is green grass, and if she can get a plenty of this she needs nothing more. In our climate the provident farmer can have an abundance of green food every day in the year. During the summer months it will not be necessary to feed if good pastures are provided, though a small ration of bran and pea-meal or bran and corn-meal, three quarts of the bran to one of the meal, twice a day, will prove beneficial when the grass is unusually succulent in spring, or rendered so by excessive rain during summer. Another advantage of feeding daily throughout the year is, that the cows, if turned to pasture during the day, will come to be

fed punctually at the hour for milking, and will submit more quietly to being milked if engaged in eating at the same time. Bran and boiled cotton-seed or bran and cotton-seed meal, three quarts of bran to one-half gallon of the seed, or three quarts of bran to one pint of the meal, answer a good purpose.

On every farm on which milch cows are kept in Georgia, and especially in the cotton belt, where no especial attention is given to providing pasturage, a small area of rich land should be devoted to some forage crop with which to supplement the pastures in case of severe drouth and consequent failure of pastures. Frequent sowings of drilled corn or several plantings of cat-tail millet will answer the purpose. The preference should be given to the drilled corn, from the fact that if not needed for feeding green it makes better cured fodder than the millet. It often happens, when no provision of this kind is made, that cows fall back in their milk on short pasturage and never recover after the grass becomes abundant. Fodder corn, or millet fed at such times would prevent such loss.

Provision should be made also for supplementing pasturage in the early fall before pea fields are opened. Millet and pea-vines cut and fed night and morning will best serve for this purpose. Late sown drilled corn is usually destroyed by the boll or corn worm and hence cannot be relied upon.

For a supply of green food during winter and spring a quarter of an acre of rich land for each milch cow kept, should be thickly sown in rye or barley, or both mixed. This should not be pastured but cut and fed to the cows twice a day, in connection with dry roughness of some kind, and a mixture of bran with some kind of meal or cotton seed or cotton seed meal. Turnips, parsnips, pumpkins, sweet potatoes, beets or collard leaves may be used in connection with the green small grain and dry food.

There need be no difficulty about having plenty of appropriate food for cows in Georgia if advantage is taken of our advantages of soil and climate.

One acre of small grain cut and fed to cows will supply as many as four acres, pastured in the usual way.

Rye sown very thick early in September or the latter part of August on rich or well manured land will be ready for cutting for feeding purposes by the 15th of November, and may be cut daily from that date, (except in unusually cold spells when it is better not to disturb it) until May, when the ground may be planted in another crop.

When pastured, the hoofs of the cattle destroy much of the tender grain besides, except when the ground is quite dry, injuring the soil. Again, the cut grain may be fed regularly, while the cows are often deprived of the pasturage for weeks at a time, when the ground is too wet to admit them without injury to the soil. For the last two winters the writer has cut rye daily (except a few days when frozen) from the 15th of November to the May following.

The same area grazed would not have supplied pasturage one-fourth of the time. There is no excuse, therefore, for a scarcity of milk nor for any farmer to have inferior butter upon his table at any season of the year in any section of Georgia, and yet so little attention is given to dairy cows and dairy products that "country butter" has become synonymous with "poor butter." Those who give proper attention to feeding and milking their cows, and to the management of the milk and butter, produce as fine an article as can be found anywhere, but such are, as yet, the exceptions.

The following tables of "nutritive values of different feeding stuffs" will be useful to those who desire to give attention to economical feeding:

NUTRITIVE VALUE OF DIFFERENT FEEDING STUFFS.

Prof. W. O. Atwater, of Connecticut, reported the following tables to the *American Agriculturist* during the early part of this year. They will repay careful study :

TABLE No. 1.

Average Composition, Digestibility and Money Value, as given by Dr. Wolff, for Germany, 1880, in Farmer's Almanac.

I.—HAY.

KIND OF FODDER.	PER CENT.—ORGANIC SUBSTANCE.								Nutritive Ratio—As 1.	Dollars per 100 lbs.—\$.	
	Water.	Ash.	Total.				Digestible.				
			Albuminoids.	Fibre.	Other Carbohy- drates.	Fat.	Albuminoids.	Carbohydrates, including Fibre			Fat.
Meadow Hay, poor	14.3	5.0	7.5	33.5	38.2	1.5	3.4	34.9	0.5	10.6	0.48
“ “ medium	14.3	6.2	9.7	26.3	41.4	2.5	5.4	41.0	1.0	8.0	0.64
“ “ very good	15.0	7.0	11.7	21.9	41.6	2.8	7.4	41.7	1.3	6.1	0.75
Red clover, poor	15.0	5.1	11.1	28.9	37.7	2.1	5.7	37.9	1.0	7.1	0.59
“ “ medium	16.0	5.3	12.3	26.0	38.2	2.2	7.0	38.1	1.2	5.9	0.70
“ “ very good	16.5	6.0	13.5	24.0	37.1	2.9	8.5	38.2	1.7	5.0	0.79
White Clover, medium. . .	16.5	6.0	14.5	25.6	33.9	3.5	8.1	35.9	2.0	5.0	0.76
Lucerne, medium. . . .	16.0	6.2	14.4	33.0	27.9	2.5	9.4	28.3	1.0	3.3	0.71
Swedish (Alsike) Clover . .	16.0	6.0	15.0	27.0	32.7	3.3	8.6	34.8	1.8	4.6	0.76
Fodder Vetch, medium. . .	16.7	8.3	14.2	25.5	32.8	2.5	9.4	32.5	1.5	3.9	0.77
Peas in bloom.	16.7	7.0	14.3	28.2	34.2	2.6	9.4	33.1	1.6	4.0	0.77
Fodder Rye	14.3	5.1	10.4	23.1	44.5	2.8	6.6	44.3	1.3	7.2	0.72
Timothy.	14.3	4.5	9.7	22.7	45.8	3.0	5.8	43.4	1.4	8.1	0.70
Italian Rye Grass	14.3	7.8	11.2	22.9	40.6	3.2	7.1	41.5	1.4	6.3	0.74
Upland Grasses, average . .	14.3	5.8	9.5	28.7	39.1	2.6	5.3	40.9	1.1	8.2	0.64
Hungarian Grass	13.4	5.7	10.8	29.4	38.5	2.2	6.1	41.0	0.9	7.1	0.66

II.—GREEN FODDER.

Grass just before bloom	75.0	2.1	3.0	6.0	13.1	0.8	2.0	13.0	0.4	7.0
Pasture Grass	80.0	2.0	3.5	4.0	9.7	0.8	2.5	9.9	0.4	4.4
Rich Pasture Grass	78.2	2.2	4.5	4.0	10.1	1.0	3.4	10.9	0.6	3.6
Italian Rye Grass	73.4	2.8	3.6	7.1	12.1	1.0	2.3	12.6	0.4	5.9
Timothy Grass	70.0	2.2	3.4	8.0	16.3	1.1	2.1	16.0	0.5	8.2
Upland Grasses, average	70.0	2.1	3.4	10.1	13.4	1.0	1.9	14.2	0.5	8.1
Fodder Rye	76.0	1.6	3.3	7.9	10.4	0.8	1.9	11.0	0.4	6.3
Fodder Oats	81.0	1.4	2.3	6.5	8.3	0.5	1.3	8.9	0.2	7.2
Fodder Corn	82.9	1.3	1.2	5.2	8.8	0.6	0.7	8.4	0.3	13.0
Sorghum	77.3	1.1	2.5	6.7	11.7	0.7	1.6	11.9	0.3	7.4
Hungarian, in blossom	75.0	1.8	3.1	8.5	10.9	0.7	1.8	11.8	0.3	7.0
Pasture Clover, young	83.0	1.5	4.6	2.8	7.2	0.9	3.6	7.4	0.6	2.5
Red Clover, before blossom . . .	83.0	1.5	3.3	4.5	7.0	0.7	2.3	7.4	0.5	3.8
Red Clover, in full blossom . .	80.4	1.3	3.0	5.8	8.9	0.6	1.7	8.7	0.4	5.7

TABLE NO. 1.—GREEN FODDER.—*Continued.*

KIND OF FODDER.	PER CENT.—ORGANIC SUBSTANCE.										Nutritive Ratio—As 1.	Dollars per 100 lbs.—\$.
	Water.	Ash.	Total.				Digestible.					
			Albuminoids	Fibre.	Other Carbohy- drates.	Fat.	Albuminoids.	Carbohydrates. Including fibre	Fat.			
White Clover, in blossom	80.5	2.0	3.5	6.0	7.2	0.8	2.2	7.9	0.5	4.2	0.16	
Alsike Clover, beginning of blossom	85.0	1.5	3.3	4.5	5.1	0.6	2.1	5.8	0.4	3.2	0.17	
Lucerne, “ “	74.0	2.0	4.5	9.5	9.2	0.8	3.2	9.1	0.3	3.1	0.23	
Fodder Vetch, “ “	82.0	1.8	3.5	5.5	6.6	0.6	2.5	6.7	0.3	3.0	0.18	
Fodder Peas in blossom	81.5	1.5	3.2	5.6	7.6	0.6	2.2	7.4	0.3	3.7	0.18	
Buckwheat in blossom	85.0	1.4	2.4	4.2	6.4	0.6	1.5	6.6	0.4	5.1	0.14	
Fodder cabbage	84.7	1.6	2.5	2.4	8.1	0.7	1.8	8.2	0.4	5.2	0.17	
Carrot leaves.	82.2	3.6	3.2	3.0	7.1	1.0	2.2	7.0	0.5	3.8	0.18	
Rutabaga leaves	88.4	2.3	2.1	1.6	5.2	0.5	1.5	5.1	0.3	3.9	0.12	
Fermented Corn Fodder	78.6	1.7	1.2	8.4	9.0	1.1	0.7	10.4	0.5	16.6	0.15	

III.—STRAW.

Winter Wheat	14.3	4.6	3.0	40.0	36.9	1.2	0.8	35.6	0.4	45.8	0.37	
Winter Rye	14.3	4.1	3.0	44.0	33.3	1.3	0.8	36.5	0.4	46.9	0.35	
Summer Barley	14.3	4.1	3.5	40.0	36.7	1.4	1.3	40.6	0.5	32.2	0.44	
Oat	14.3	4.0	4.0	39.5	36.2	2.0	1.4	40.1	0.7	29.9	0.45	
Fodder Vetch	16.0	4.5	7.5	42.0	29.0	1.0	3.4	31.9	0.5	9.8	0.46	
Pea	16.0	4.5	6.5	38.0	34.0	1.0	2.9	33.4	0.5	12.0	0.44	
Field Bean	16.0	4.6	10.2	34.0	34.2	1.0	5.0	35.2	0.5	7.3	0.55	
Seed Clover	16.0	5.6	9.4	42.0	25.0	2.0	4.2	28.5	0.0	7.4	0.49	
Corn Stalks.	15.0	4.2	3.0	40.0	36.7	1.0	1.1	37.0	0.3	34.4	0.39	

CHAFF, HULLS, ETC.

Wheat	14.3	9.2	4.6	36.0	34.6	1.4	1.4	32.8	0.4	24.1	0.37	
Rye	14.3	7.5	3.6	43.5	29.9	1.2	1.1	34.9	0.4	32.6	0.37	
Oats	14.3	10.0	4.0	34.0	36.2	1.5	1.6	36.6	0.6	23.8	0.39	
Barley	14.3	13.0	3.0	30.0	38.2	1.5	1.2	35.0	0.6	30.4	0.38	
Pea	15.0	6.0	8.1	32.0	36.9	2.0	4.0	36.2	1.2	9.8	0.55	
Bean	15.0	5.5	10.5	33.0	34.0	2.0	5.1	34.7	1.2	7.4	0.53	
Corn Cobs.	14.0	2.8	1.4	37.8	42.6	1.4	0.6	41.7	0.4	71.1	0.41	

ROOTS AND TUBERS.

Potatoes	75.0	0.9	1.1	1.1	21.7	0.2	1.1	22.8	0.2	21.6	0.26	
Jerusalem Artichokes	80.0	1.0	2.0	1.3	15.5	0.2	2.0	16.8	0.2	8.7	0.24	
Fodder Beets	88.0	0.8	0.5	0.9	9.7	0.1	0.5	10.6	0.1	21.7	0.12	
Sugar Beets	81.5	0.7	1.0	1.3	15.4	0.1	1.0	16.7	0.1	17.0	0.19	
Carrots.	85.0	0.9	1.4	1.7	10.8	0.2	1.4	12.5	0.2	9.3	0.18	
Rutabagas	87.0	1.0	1.3	1.1	9.5	0.1	1.3	10.6	0.1	8.3	0.15	
Turnips	92.0	0.7	1.1	0.8	5.3	0.1	1.1	6.1	0.1	5.8	0.11	
Parsnips.	88.3	0.7	1.6	1.0	10.2	0.2	1.6	11.2	0.2	7.3	0.18	

TABLE No. 1.—*Continued.*

GRAINS AND FRUITS.

KIND OF FODDER.	PER CENT.—ORGANIC SUBSTANCE.										Nutritive Ratio—As 1.	Dollars per 100 lbs.—\$.
	Water.	Ash.	Total.				Digestible.					
			Albuminoids.	Fibre.	Other Carbohy- drates.	Fat.	Albuminoids.	Carbohydrates, including fibres.	Fat.			
Wheat	14.4	1.7	13.0	3.0	66.4	1.5	11.7	64.3	1.2	5.8	1.13	
Rye	14.3	1.8	11.0	3.5	67.4	2.0	9.9	65.4	1.6	7.0	1.08	
Barley	14.3	2.2	10.0	7.1	63.9	2.5	8.0	58.9	1.7	7.9	0.95	
Oats	14.3	2.7	12.0	9.3	55.7	6.0	9.0	43.3	4.7	6.1	0.98	
Indian Corn	14.4	1.5	10.0	5.5	62.1	6.5	8.4	60.6	4.8	8.6	1.11	
Buckwheat	14.0	1.8	9.0	15.0	58.7	1.5	6.8	47.0	1.2	7.4	0.77	
Rice, hulled	14.0	0.5	7.7	2.2	75.2	0.4	6.9	72.7	0.3	0.7	0.96	
Peas	14.3	2.4	22.4	6.4	52.5	2.0	20.2	54.4	1.7	2.9	1.44	
Field Beans	14.5	3.1	25.5	9.4	45.9	1.6	23.0	50.2	1.4	2.3	1.51	
Linseed	12.3	3.4	20.5	7.2	19.6	37.0	17.2	18.9	35.2	...	2.47	
Rape seed	11.8	3.9	19.4	10.3	12.1	42.5	15.5	10.2	40.4	...	2.55	
Hemp seed	12.2	4.5	16.3	12.1	21.3	33.6	12.2	16.2	30.2	...	2.01	
Cotton seed	7.7	7.8	22.8	16.0	15.4	30.3	17.1	14.7	27.3	...	2.08	
Apples and Pears	83.1	0.4	0.4	4.3	11.8	...	0.3	12.9	...	43.0	0.13	
Pumpkins.	89.1	1.0	0.6	2.7	6.5	0.1	0.4	7.1	0.1	18.4	0.08	

IV.—MANUFACTURING AND WASTE PRODUCTS, ETC.

Sugar Beet cake	70.0	3.4	1.8	6.3	18.3	0.2	1.8	24.6	0.2	13.9	0.30
Potato, } Residue from man-	86.0	0.4	0.8	2.0	11.7	0.1	0.8	13.7	0.1	17.4	0.16
Rye, } ufacture of starch.	70.0	0.8	6.1	2.7	18.9	1.5	5.2	18.1	1.2	4.1	0.44
Wheat, }	74.0	0.6	4.4	3.4	15.4	2.2	3.7	15.1	1.8	5.3	0.37
Brewers' Grains	76.6	1.2	4.9	5.2	11.0	1.1	3.9	10.8	0.8	3.4	0.30
Malt Sprouts	10.1	7.2	17.6	14.3	48.7	2.1	12.8	51.6	1.7	4.7	1.09
Wheat Bran, fine	13.1	5.4	14.0	8.7	55.0	3.8	11.8	44.4	3.0	4.4	1.04
“ “ coarse	12.9	6.6	15.0	10.1	52.2	3.2	12.6	42.7	2.6	3.9	1.04
Rye Bran	12.5	5.2	14.5	5.7	58.6	4.5	12.2	46.2	3.6	4.5	1.10
Wheat Meal	11.5	3.0	13.9	4.8	63.5	3.3	10.8	54.0	2.9	5.7	1.08
Indian Corn Bran	11.8	3.4	10.2	9.0	61.8	3.8	7.9	56.6	3.4	8.2	0.99
Buckwheat Bran	14.0	3.4	17.1	14.7	46.4	4.4	13.5	44.0	3.9	4.0	1.15
Rice Meal	9.9	10.6	10.9	11.1	47.6	9.9	8.6	47.2	8.8	8.0	1.16
Linseed Cake	12.2	8.8	29.5	9.7	29.9	9.9	24.8	27.5	8.9	2.0	1.72
Linseed Meal (extracted)	9.7	7.3	33.2	8.8	38.7	2.3	27.8	33.9	2.1	1.4	1.61
Palm Nut Cake	10.5	4.2	16.9	17.4	41.0	10.0	16.1	55.4	9.5	4.9	1.61
Cotton Seed Cake	11.3	6.4	22.6	22.1	30.5	6.1	17.5	14.9	5.5	1.7	1.14
“ “ “ decorticated	11.2	7.6	38.8	9.2	19.5	13.7	31.0	18.3	12.3	1.6	2.07
Flesh Meal	11.5	3.7	72.8	...	...	12.0	69.2	...	11.2	0.4	3.54
Dried Blood	12.0	4.1	80.8	...	2.6	0.5	54.1	2.6	0.5	...	2.32
Cow's Milk	87.5	0.7	3.2	...	5.0	3.6	3.2	5.0	3.6	4.4	0.34
Skimmed Milk	90.0	0.8	3.5	...	5.0	0.7	3.5	5.0	0.7	1.9	0.23
Buttermilk	90.1	0.5	3.0	...	5.4	1.0	3.0	5.4	1.0	2.6	0.22
Condensed Milk	21.5	2.5	10.2	...	52.9	12.9	10.2	52.9	12.9	8.3	1.48
Whey	92.6	0.7	1.0	...	5.1	0.6	1.0	5.1	0.6	6.6	0.11
Cream	62.0	0.6	2.7	...	2.9	31.8	2.7	2.9	31.8	0.5	1.54

EXPLANATION OF THE TABLE.

The table herewith is taken, with some slight alterations, from a much larger one by Wolff, in the "German Farmers' Almanac." These figures, from European products mostly German, represent the average results of many hundreds of analyses, but they enable American farmers to estimate the probable composition of their own feeding stuffs. So far as analyses made up to the present time show, the American and European products in general agree pretty closely. The most marked exceptions are in grasses and hays, ours averaging poorer than the European, probably because of poor manuring and much poorer culture.

Water.—The figures in the first column give the number of pounds of water in 100 pounds. Thus 100 pounds of young grass contain from 75 to 80 pounds of water, while 100 pounds of dry hay contain only about $14\frac{1}{2}$ pounds. In 100 pounds of bran there are about 13 pounds of water, while 100 pounds of potatoes contain 75 pounds of water, and 100 pounds of turnips 92 pounds of water. The bran thus has $(100-13)$ about 87 per cent., or $\frac{7}{8}$ of dry substance; the potatoes 25 per cent. or $\frac{1}{4}$; and the turnips only 8 per cent., or one-twelfth dry matter.

Ash or Mineral Matters.—The mineral matters, potash, soda lime, phosphoric acid, etc., which remain as ashes when the material is burned, vary from $\frac{3}{4}$ pound in 100 pounds of milk, to from 5 to 8 pounds in 100 pounds of bran or linseed cake. These substances are necessary for supporting animal life, but there is generally an abundance of them in all the foods used on the farm.

Organic Substance, Total and Digestible.—Columns 2 6 give the Albuminoids, Carbo-hydrates and Fats, which together make up the combustible or Organic Substance. Columns 7, 8 and 9 give the amounts of these that are digestible. The figures represent general averages, as

shown by the results of probably more than 1,200 actual feeding trials, with oxen, cows, horses, sheep and swine. The digestibility of the materials, as Hungarian grass, which have not been tested, is calculated from the known digestibility of similar foods.

Nutritive Ratio.—The “nutritive ratio” expresses the ratio of digestible albuminoids to digestible carbo-hydrate and fats (each pound of fats being assumed equal to 2.5 of carbo-hydrates); that is to say it shows the number of pounds of digestible carbo-hydrates to one pound of digestible albuminoids. For instance, the “poor” hay contains 1 pound of albuminoids to 10.6 pounds of digestible carbo-hydrates. The nutritive ratio is 1:10.6. The “very good” hay has 1 of albuminoids to every 6.1 of carbo-hydrates. The ratio is 1:6.1. Linseed cake and cotton seed cake are rich in digestible albuminoids, having 1 pound to every 2 pounds of carbo-hydrates, while straw is very poor, the nutritive rate being 1 to 30 or even 1 to 45. The value of a food in practice depends mainly upon the amounts and proportions of digestible ingredients it contains, and the way it is fed. The “as 1” at head of column, “Nutritive Ratio,” means *as one to—*.

The Money Value of the Foods in the table are calculated by assigning a certain price to each pound of digestible ingredients. The prices assumed by Wolff for the German market in 1880, are for digestible albuminoids and fats, each $4\frac{1}{2}$ cents per pound, and for carbo-hydrates ninth cents per pound. They vary a little, but not widely, from the values in many of our American markets. Of course these values are relative, and apply only when properly fed. Doubtless both the prices current in our markets, and the intrinsic facts of the case would require a revision of these rates to make the valuations entirely correct with us. Nor can such computations be absolutely accurate at best, but they do give a general idea of the

comparative values of the materials as food for stock *when properly used.*

TABLE No. 2.

ECONOMY IN CATTLE FEEDING, COMPOSITION OF FOODS, FEEDING STANDARDS AND RATIONS FOR FARM ANIMALS.

Table No. 1 gave the average amounts of the food ingredients, albuminoids, carbo-hydrates and fats contained in different foods, and likewise the amounts of these that are from feeding trials, estimated to be actually digestible. It is the digestible parts of the food that supply the wants of the animal, that are made over into flesh and fat, skin and bone, milk and progeny, and are used to produce heat to keep the body warm, and muscular power for work. It is with these, therefore, that we have mainly to do in feeding.

FEEDING STANDARDS.

Having noted how much of the nutritive ingredients our feeding stuffs contain, the next step is to learn how much of each different animals need for maintenance and for production of meat, milk, work, etc. The German experimenters have studied into this matter very carefully, in two ways: first, by experiments, feeding animals with different kinds and amounts of food, and noting the effects; second, by observing the methods and results of feeding, as practiced by the most successful farmers. On the basis of these two kinds of observations feeding standards have been calculated, as shown below. In brief, it has been found that full-grown oxen at rest in the stall, can be kept for long periods in fair condition with food of such sort as to supply them, per 1,000 lbs. live weight, with 0.6 lbs. albuminoids, and 7.0 lbs. carbo-hydrates, in forms to be digested and taken into the circulation. It has been found well to have this supplied by 14-15 lbs. dry substance in the food. With rations furnishing these amounts of digestible ingredients, there has sometimes

been observed a slight improvement, but perhaps oftener a small falling off in condition. It appears on the whole, better to increase the ration, so as to give 0.7 lbs. nitrogenous, and a little over 8 lbs. non-nitrogenous nutrients, with a nutritive ratio of 1:12. It seems to make little difference in what forms these are given, whether in hay, straw, oat-meal or otherwise, provided the food be wholesome and palatable. These materials suffice to make up for the wastes of the animal's body, to keep it warm, and to produce the small amount of muscular power needed when the animal is at rest.

If, now, the ox is to be worked or fattened, food for production of meat or force is required. Or if, instead of an ox, we have a milch cow, she will need food for production of milk, in addition to what is necessary to maintain her body in good condition. And this food for production must be not only larger in quantity, but different in quality; it must have a larger proportion of albuminoids, as the Germans say, the nutritive ratio must be narrower. Thus Wolff recommends for a daily ration for milch cows, per 1,000 lbs. live weight, 2.5 lbs. digestible albuminoids, 12.5 digestible carbo-hydrates, and 0.4 lbs. digestible fats, with a nutritive ratio of 1:5.4. This is just about what would be contained in 30 lbs. of fine quality, young, cut hay, or 120 lbs. of young grass, either of which would make a very good daily ration for milch cow. The following table by Wolf, from the "Farmer's Almanac" referred to, gives feeding standards for various domestic animals. The first column gives the total amount of organic substance—that is, the whole food, less water and ash, in the daily ration. The next three columns give the amounts of digestible albuminoids, carbo-hydrates, and fats. The fifth column, "Total nutritive substance," is the sums of the digestible nutrients in the previous three columns. The last column gives the ratio of albuminoids to carbo-hydrates, or the nutritive ratio.

Feeding Standards.

KIND OF ANIMAL, WEIGHT, AGE, ETC.			Total organic substances.	Nutritive (digestible) substances.			Total nutritive substance.	Nutritive ratio.
			lbs.	Albuminoids.	Carbohy- drates.	Fats.	lbs.	as 1:
A.—PER DAY AND PER 1,000 POUNDS LIVE WEIGHT.								
1. Oxen at rest in stall.			17.5	0.7	8.0	0.15	8.85	12.
2. Wool sheep, coarser breeds			20.0	1.2	10.3	0.20	11.70	9.
Finer breeds			22.5	1.5	11.4	0.25	13.15	8.
3. Oxen, moderately worked			24.0	1.6	11.3	0.30	13.20	7.5
Heavily worked			26.0	2.4	13.2	0.50	16.10	6.
4. Horses, moderately worked			22.5	1.8	11.2	0.60	13.60	7.
Heavily worked			25.5	2.8	13.4	0.80	17.00	5.5
5. Milch cows			24.0	2.5	12.5	0.40	15.40	5.4
6. Fattening oxen, 1st period			27.0	2.5	15.0	0.50	18.00	6.5
2d period			26.0	3.0	14.8	0.70	18.50	5.5
3d period			25.0	2.7	14.8	0.60	18.10	6.0
7. Fattening sheep, 1st period			26.0	3.0	15.2	0.50	18.70	5.5
2d period			25.0	3.5	14.4	0.50	18.50	4.5
8. Fattening swine, 1st period			36.0	5.0	27.5		32.50	5.5
2d period			31.0	4.0	20.0		28.00	6.0
3d period			23.5	2.7	17.5		20.20	6.5
9. Growing cattle:								
Age, months.	Average live weight per h'd							
2—3	150 lbs		22.0	4.0	13.8	2.0	19.8	4.7
3—6	300 "		23.4	3.2	13.5	1.0	17.7	5.0
6—12	500 "		24.0	2.5	13.5	0.6	16.6	6.0
12—18	700 "		24.0	2.0	13.0	0.4	15.4	7.0
18—24	850 "		24.0	1.6	12.0	0.3	13.9	8.0
18. Growing sheep:								
5—6	56 "		28.0	3.2	15.6	0.8	19.6	5.5
6—8	67 "		25.0	2.7	13.3	0.6	16.6	5.5
8—11	75 "		23.0	2.1	11.4	0.5	14.0	6.0
11—15	82 "		22.5	1.7	10.9	0.4	13.0	7.0
15—20	85 "		22.0	1.4	10.4	0.3	12.1	8.0
Growing fat pigs:								
2—3	50 lbs		42.0	7.5	30.0		37.5	4.0
3—5	100 "		34.0	5.0	25.0		30.0	5.0
5—6	125 "		31.5	4.3	23.9		28.0	5.5
6—8	170 "		27.0	3.4	20.4		23.8	6.0
8—12	250 "		21.0	2.5	16.2		18.7	6.5
B.—PER DAY AND PER HEAD.								
Growing cattle:								
2—3	150 lbs		2.3	0.6	2.1	0.30	3.00	4.7
3—6	300 "		7.0	1.0	4.1	0.30	5.40	5.0
6—12	500 "		12.0	1.3	6.8	0.80	8.40	6.0
12—18	700 "		16.8	1.4	9.1	0.28	10.78	7.0
18—23	850 "		20.4	1.4	10.3	0.26	11.96	8.0

Feeding Standards.—Continued.

KIND OF ANIMAL, WEIGHT, AGE, ETC.	Total organic substance.	Nutritive (digestible) substances.			Total nutritive substance.	Nutritive ratio.
		Albumi- noids.	Carbohy- drates.	Fats.		
B.—PER DAY AND PER HEAD.	lbs.	lbs.	lbs.	lbs.	lbs.	as 1:
Growing sheep:						
5—6 56 lbs	1.6	0.18	0.87	0.045	1.095	5.5
6—8 67 “	1.7	0.17	0.85	0.040	1.060	5.5
8—11 75 “	1.7	0.16	0.85	0.037	1.047	6.0
11—15 82 “	1.8	0.14	0.89	0.032	1.062	7.0
15—20 85 “	1.9	0.12	0.88	0.025	1.047	8.0
Growing fat swine:						
2—3 50 lbs.	2.1	0.38	1.50		1.88	4.0
3—5 100 “	3.4	0.50	2.50		3.00	5.0
5—6 125 “	3.9	0.54	2.96		3.50	5.5
6—8 170 “	4.6	0.58	3.47		4.05	6.0
8—12 250 “	5.2	0.62	4.05		4.67	6.5

PRACTICAL APPLICATION—CALCULATION OF DAILY RATIONS FOR FARM ANIMALS.

To use the feeding standards, let us take some of the feeding stuffs in table No. I, and leaving out of account the water, ash, and total amount of the ingredients, note the amounts of digestible ingredients as shown in the condensed table below:

Digestible Ingredients of Fodder Stuffs.

KIND OF FODDER.	Digestible food ingredients.			Nutritive ratio.
	Albumi- noids.	Carbohy- drates, in- clud g fibre.	Fats.	
I.—HAY.	per ct.	per ct.	per ct.	as 1:
Meadow Hay, poor	3.4	34.9	0.5	10.6
“ “ medium	5.4	41.0	1.0	8.0
“ “ very good	7.4	41.7	1.3	6.1
Red Clover, poor	5.7	37.9	1.0	7.1
“ “ medium	7.0	38.1	1.2	5.9
“ “ very good	8.5	38.2	1.7	5.9

Digestible Ingredients of Fodder Stuffs.—Continued.

KIND OF FODDER.	Digestible food ingredients.			Nutritive ratio.
	Albumi- noids.	Carbohy- drates including fibre.	Fats.	
	per ct.	per ct.	per ct.	as 1:
II.—STRAW.				
Winter Wheat,	0.8	35.6	0.4	45.8
Winter Rye,	0.9	36.5	0.4	46.9
Oat,	1.4	40.1	0.7	29.9
III.—ROOTS AND TUBERS.				
Potatoes, Irish	1.1	22.8	0.2	21.6
Sugar Beets,	1.0	16.7	0.1	17.0
Turnips,	1.1	6.1	0.1	5.8
IV.—MANUFACTURING AND WASTE PRODUCTS, ETC.				
Sugar Beet Cake	1.8	24.6	0.2	13.9
Malt Sprouts	12.8	51.6	1.7	4.7
Wheat Bran, coarse	12.6	42.7	2.6	3.9
Rye Bran,	12.2	46.2	3.6	4.5
Linseed Cake,	24.8	27.5	8.9	2.0
Palm Nut Cake,	16.1	54.4	9.5	4.9
Cotton-seed Cake,	17.5	14.9	5.5	1.7
Cotton seed Cake discorticated	31.0	18.3	12.3	1.6
Flesh Meal	69.2	....	11.2	0.4

Suppose now that I wish to feed my oxen that are standing in the stable doing no work, on medium quality hay and oat straw, and add enough wheat bran to keep them in good store condition. By the above figures there will be contained in:

	Albuminoids.	Carbo-hydrates.	Fats.	Total
	lbs.	lbs.	lbs.	lbs.
6 pounds medium hay	0.32	2.5	0.06	2.88
12 pounds oat straw	0.17	4.8	0.08	5.05
2 pounds wheat bran	0.25	0.8	0.05	1.10
Whole daily ration	0.74	8.1	0.19	9.03
Standard ration	0.8	8.0	0.15	8.85

That is, 6 pounds of medium hay, 12 pounds oat straw, and 2 pounds wheat bran, will furnish just about the

quantities of digestible albuminoids, carbo-hydrates and fats, that the standard per day for 1,000 pounds, live weight, requires.

My friend and former assistant, Prof. W. H. Jordan, of the Maine Agricultural College, has made use of the feeding standards above given in calculating the following rations for various farm animals. It is not meant that just these proportions must be used. There are wide variations in the composition, digestibility, and flavor of the same feeding stuffs. So likewise the individual peculiarities of the animals, their size, condition, varying capacities for digesting, and more especially, for their food, differ greatly. Hence the rations need to be adapted to particular cases. The important thing is to mix the foods on hand, or to be bought, so as to secure the best results at the lowest cost. These are simply examples of mixtures that contain the nutrients in about the proportions believed to be best adapted to the purpose. I cannot give what seems to me the right view of this system of calculating food rations, better than in the words of a shrewd and intelligent German farmer, who has had considerable experience in their use: "As indications of what is best, they are invaluable; to follow them blindly would be folly."

DAILY RATIONS FOR 1,000 POUNDS LIVE WEIGHT.

(A) MAINTENANCE. FODDER FOR FULL GROWN, LABOR-FREE OXEN.

<i>lbs.</i>	No. 1.	<i>lbs.</i>	No. 2.
6	Med'm meadow hay	5	Clover hay, best
12	Oat straw	18½	Wheat straw
2	Wheat bran	½	Linseed cake
<i>lbs.</i>	No. 3.	<i>lbs.</i>	No. 4.
6	Poor timothy	15	Oat straw
17	Corn stalks	20	Potatoes
4	Corn meal	1	Cotton-seed meal
<i>lbs.</i>	No. 5.	<i>lbs.</i>	No. 6.
10	Poor Timothy	6	Clover hay, best
20	Sugar beets	15	Oat straw
2	Corn meal		

(B) FODDER FOR OXEN AT MODERATE WORK.

<i>lbs.</i>	<i>No. 7.</i>	<i>lbs.</i>	<i>No. 8.</i>
20	Good meadow hay	20	Medium timothy
6½	Corn meal	2	Coarse bran
		4	Corn meal
<i>lbs.</i>	<i>No. 9.</i>	<i>lbs.</i>	<i>No. 10.</i>
12	Good meadow hay	12	Clover hay, best
13	Oat straw	10	Rye straw
3	Linseed cake	22	Potatoes
<i>lbs.</i>	<i>No. 11.</i>	<i>lbs.</i>	<i>No. 12.</i>
12.	4 Clover hay, good	10	Clover hay, best
10	Wheat straw	14	Oat straw
7	Wheat bran	20	Mangolds
		1	Cotton-seed meal

(C) FODDER FOR OXEN AT SEVERE WORK.

<i>lbs.</i>	<i>No. 13.</i>	<i>lbs.</i>	<i>No. 14.</i>
20	Best meadow hay	17	Clover, good
10	Corn meal	3	Wheat bran
		10.	Corn meal
<i>lbs.</i>	<i>No. 15.</i>		
25	Medium meadow		
3	Wheat bran hay		
3	Linseed cake		

(D) WINTER FODDER FOR MILCH COWS.

<i>lbs.</i>	<i>No. 16.</i>	<i>lbs.</i>	<i>No. 17.</i>
20	Best meadow hay	20	Good Clover
5	Wheat bran	20	Beet pulp
3	Palm-nut meal	2	Cotton seed meal
<i>lbs.</i>	<i>No. 18.</i>	<i>lbs.</i>	<i>No. 19.</i>
17	Best meadow hay	10	Clover hay, best
16	Corn stalks	15	Poor timothy
3	Wheat bran	20	Turnips
2	Cotton seed meal	3½	Linseed cake
<i>lbs.</i>	<i>No. 20.</i>	<i>lbs.</i>	<i>No. 21.</i>
20	Hungarian hay	20	Clover hay, best
20	Mangolds	2½	Wheat bran
3	Wheat bran	50	Turnips
2	Linseed cake		
<i>lbs.</i>	<i>No. 22.</i>	<i>lbs.</i>	<i>No. 23.</i>
10	Best meadow hay	20	Clover hay, med'm.
15	Wheat straw	30	Mangolds.
5	Wheat bran	4	Malt sprouts
3½	Cotton-seed meal		

<i>lbs.</i>	<i>No. 24.</i>
20	Clover hay, best
30	Turnips
6	Corn meal

FODDER FOR GROWING CATTLE, ONE TO TWO YEARS OLD.

<i>lbs.</i>	<i>No. 25.</i>
15	Medium meadow hay
18	Rye straw
2	Cotton-seed meal

<i>lbs.</i>	<i>No. 26.</i>
20	Oat straw
30	Turnips
5	Wheat bran
2	Cotton-seed meal

<i>lbs.</i>	<i>No. 27.</i>
15	Medium meadow hay
20	Corn stalks
1 $\frac{3}{4}$	Meat scraps

<i>lbs.</i>	<i>No. 28</i>
10	Good clover
10	Oat straw
8	Corn stalks
2	Cotton-seed meal

<i>lbs.</i>	<i>No. 29.</i>
20	Poor meadow hay
20	Potatoes
1 $\frac{1}{2}$	Dry ground fish

<i>lbs.</i>	<i>No. 30.</i>
20	Good meadow hay
20	Mangolds
4	Coarse wheat bran

(G) FODDER FOR FATTENING CATTLE.

<i>lbs.</i>	<i>No. 31.</i>
22	Clover hay, best
8	Corn meal

<i>lbs.</i>	<i>No. 32.</i>
20	Medium meadow hay
10	Oat straw
30	Mangolds
3 $\frac{1}{2}$	Cotton-seed meal

<i>lbs.</i>	<i>No. 33.</i>
20	Good meadow hay
100	Pumpkins
3 $\frac{1}{2}$	Cotton-seed meal

<i>lbs.</i>	<i>No. 34.</i>
20	Best meadow hay
30	Sugar-beet pulp
2	Linseed cake

<i>lbs.</i>	<i>No. 35.</i>
22	Best meadow hay
50	Turnips
5	Corn meal

<i>lbs.</i>	<i>No. 36.</i>
15	Clover hay, best
10	Barley straw
40	Mangolds
3	Linseed cake

FODDER FOR SHEEP PRODUCING WOOL.

<i>lbs.</i>	<i>No. 37.</i>
15	Clover hay, good
10	Poor hay
3	Oats

<i>lbs.</i>	<i>No. 38.</i>
10	Medium hay
15	Bean straw
4	Corn

lbs. *No. 39.*

20 Pea straw

20 Potatoes

2 Cotton-seed meal

lbs. *No. 41.*

10 Best clover

10 Barley straw

1½ Fish scrap

lbs. *No. 40.*

20 Oat straw

30 Mangolds

1½ Dried flesh

lbs. *No. 42.*

20 Poor meadow hay

Clover hay, best

4 Corn

MORE ABOUT FEEDING STUFFS AND FODDER RATIONS.

(By Prof. W. O. Atwater, of Wesleyan University, Middleton, Conn.)

There are too very important matters connected with the economical feeding of stock which the teachings of modern science explain, but which too few farmers understand, how to adapt the food most economically to the wants of the animal and the purpose for which it is fed, and how to feed so as to make the richest and best manure.

Either the concurrent testimony of the most advanced science and the most profitable practice is false, or the farmers, of our older States especially, must improve their methods of feeding to farm most successfully. For this they need especially to—1st: Produce better foods by better manuring and culture, and by more careful gathering and housing. 2d. Carefully save the poorer food and waste products, and feed them so as to utilize the large amount of nutriment they contain. 3d. Use a greater variety of feeding stuffs, and in proper mixtures. 4th. Use more nitrogenous foods—*i. e.*, (a) Raise more clover, and, where circumstances will allow, beans, peas, lucern, and leguminous plants. (b) Buy cotton-seed meal, linseed meal, palm-nut meal, bran, and other nitrogenous foods. (c) mix these rich materials with poor hay, straw, corn-stalks, and the like, in such proportions as are fitted to the wants of the animals and the purposes for which they are fed. This will bring excellent fodder and rich manure at at very low cost. To see why these facts are so, note the table on next page.

Nutritive Ingredients of Foods and Feeding Standards.

FOODS AND FEEDING STANDARDS.	Digestible Food Ingredients.				Nutritive Ratio.
	Albuminoids.	Carbo-hydrates, including fibre.	Fat.	Total.	
<i>Feeding Stuffa.</i>					as
I.—HAY.	p.c.	p.c.	p.c.	p.c.	to
Meadow Hay, poor	3.4	34.9	0.5	38.8	10.6
" " medium	5.4	41.0	1.0	47.4	8.0
" " very good	7.4	41.7	1.3	50.4	6.1
Red Clover, poor	5.7	37.9	1.0	44.6	7.1
" " medium	7.0	38.1	1.2	46.3	5.9
" " very good	8.5	38.2	1.7	48.4	5.0
II.—STRAW.					
Winter Wheat.	0.8	35.6	0.4	36.8	45.8
Winter Rye	0.8	36.5	0.4	37.7	46.9
Oat	1.4	40.1	0.7	42.2	29.9
Corn Stalks	1.1	37.0	0.3	38.4	34.4
III.—ROOTS AND TUBERS.					
Potatoes (Irish)	1.1	22.8	0.2	24.1	21.6
Sugar Beets	1.0	16.7	0.1	17.8	17.0
Turnips	1.1	6.1	0.1	7.3	5.8
IV.—MANUFACTURING AND WASTE PRODUCTS, ETC.					
Sugar Beet Cake	1.8	24.6	0.2	26.6	13.9
Malt Sprouts	12.8	51.6	1.7	66.1	4.7
Wheat Bran, coarse	12.6	42.7	2.6	57.9	3.9
Rye Bran	22.2	46.2	3.6	62.0	4.5
Linseed Cake	24.8	27.5	8.9	61.2	2.0
Palm-Nut Meal.	16.1	55.4	9.5	81.0	4.9
Cotton-seed Cake	17.5	14.9	5.5	37.9	1.7
Cotton-seed Meal, decorticated.	31.0	18.3	12.3	61.6	1.6
Flesh Meal	69.2	...	11.2	80.4	0.4
Dry Ground Fish.	44.6	...	8.6	53.2	0.5
<i>Feeding Standard.</i>					
PER DAY AND PER 1,000 LBS. LIVE WEIGHT.	lbs.	lbs.	lbs.	lbs.	lbs.
1. Oxen at rest in stall	0.7	8.0	0.15	8.85	12.
2. Wool Sheep, coarser breeds	1.2	10.3	0.20	11.70	8.
" " finer breeds	1.5	11.4	0.25	13.15	8.
3. Oxen, moderately worked	1.6	11.3	0.30	13.20	7.5
" heavily worked	2.4	13.2	0.50	16.10	6.
4. Horses, moderately worked	1.8	11.2	0.60	13.60	7.
" heavily worked	2.8	13.4	0.80	17.00	5.5
5. Milch Cows	2.5	12.5	0.40	15.40	5.4
6. Fattening Oxen, first period	2.5	15.0	0.50	18.00	6.5
" " second period	3.0	14.8	0.70	18.50	5.5
" " third period	2.7	14.8	0.60	18.10	6.0

RICH VS. POOR FOODS—PROPORTIONS OF DIGESTIBLE ALBUMINOIDS, CARBO-HYDRATES, AND FATS.

Now let us take a poor food, as oat-straw, and compare it with good hay. One hundred pounds of "very good" hay contains about 50 lbs. of digestible material, while the same amount of oat-straw furnishes some 42 lbs. At this rate, 120 lbs. of oat-straw would supply as much nutritive material as 100 lbs. of first quality upland hay. But it would not be worth as much for fodder. Why the straw is worth less appears when we compare the amounts of the different ingredients. The 100 lbs. of hay, with its 50 lbs. of digestible matter, furnishes 7.4 lbs. of albuminoids against only 1.4 lbs. in the straw. So likewise the hay contains 1.3 lbs. of fats, the straw only 0.7 lbs. But when we come to the carbo-hydrates we find just about the same amounts in both. The straw lacks albuminoids and fats, and these are the most valuable ingredients of the food. The albuminoids make all the nitrogenous tissues of the body, the lean meat (muscle), the gristle, skin, etc., all the albumen and caseine of the milk, and part of the fat of the body and of the milk (butter), besides sharing in the production of animal heat and muscular force. The fats of the food are transformed into fats in the body, and share in the production of heat and force. They can not be made into muscle or other nitrogenous tissue, however, because they have no nitrogen. At least, the present evidence is entirely in this direction. The carbo-hydrates do not make nitrogenous tissue in the body. They are probably transformed into fats, but only to slight extent. They serve for fuel, and seem to aid in producing muscular force. They thus do a work of their own, which, if it were not for them, would be left for the costlier albuminoids and fats. So even if the carbo-hydrates are not made into flesh, fat, butter and caseine themselves, they doubtless do what amounts in practice to the same thing by saving the other ingredients to be used for these pur-

poses. Starch and sugar are carbo-hydrates, but they are at the same time valuable foods.

The reason for the inferior worth of the straw may be seen from another standpoint in the last column of the table: "*Nutritive Ratio.*" The "very good" hay has 1 lb. albuminoids for every 6 lbs. carbo-hydrates (1 lb. fat being reckoned equal to 2 1-2 lbs. carbo-hydrates), while the straw has one pound of albuminoids to 30 lbs. of carbo-hydrates. According to the feeding standards, for a milch cow a ration with 1 lb. albuminoids to 5.4 carbo-hydrates will be appropriate, while an ox at rest in the stall will do well with only 1 lb. albuminoids to 12 lbs. carbo-hydrates. The best hay will serve well for making milk, while the straw has not enough of the albuminoids and fats to make it a proper food for even store cattle. There is a great difference between

GOOD AND POOR HAY.

Upland hay cut during the period from early blossom to full blossom is easily digestible, and has a good per centage of albuminoids. But as it grows older the proportion of nitrogen decreases, and that of woody fibre grows larger, the hay becomes less digestible, the digested material is poorer because it lacks albuminoids, and finally the old hay is not so palatable. For all these reasons the late cut hay is worth far less for feeding. Grass grown on rich soil is richer in albuminoids than on poor soil. Marsh and bog hays lack albuminoids and fats. Clover, timothy, red-top, blue-grass, and the like, grown on good soil, cut early and well cured and housed, make excellent fodder. Poorly manured, cut late, and badly cured, they are very poor stuff. Much of the hay that lies in the barns all through the country is very little better than straw.

THE WAY TO USE THESE POOR FOODS

economically then must be to supply what they lack. To make boots of neck or split leather, or to throw the poor

leather away, would be bad economy. With good leather for the parts where the wear comes, the poor leather may be used for backs and linings, and thus be made valuable. So we may feed straw, corn-stalks, and over-ripe or marsh hay to advantage, provided we put other foods with them to supply the albuminoids and fats. Now note in the table the figures for clover, bran, beans, peas, oil-cake, meat scraps and dry ground fish. They have very little carbo-hydrates, but are rich in albuminoids and fats.

COTTON-SEED MEAL, LINSEED MEAL, PALM-NUT MEAL, AND
BRAN

are foods whose value farmers in this country are just beginning to appreciate. European farmers long since found out how much they are worth, and thousands of tons of American oil-cake and meal have been carried across the Atlantic to enrich English, French and German foods and soils. The time has come when we must keep them at home if we are going to redeem our farming. The great value of these foods is due to two facts: 1. They supply the albuminoids and fats in which poor hay, straw and the like are lacking. 2. They make rich manure. How they may be used with poor foods to make good rations at small cost, is illustrated in fodder rations. Chemistry indicates, experiments prove, and experience corroborates that foods, as late cut hay, marsh hay, straw, corn-stalks, etc., can be utilized and made very valuable by feeding with them nitrogenous foods such as oil-meal, bran, and clover-hay, to supply what they lack. It is proved that such mixtures make the very best rations, and still urther that this is one of the cheapest ways to get good manure.

DRIED BLOOD, MEAT SCRAP AND FISH AS FOD FOR STOOCK.

Years ago, oil-cake used to be employed as a fertilizer. Chemistry said it ought to be first fed to stock, that it has a high nutritive value, that in going through the animal machine but little of the valuable material is consumed,

and that the residue is worth more for manure than before. Experience proved that all this is true, and now nobody would think of using linseed cake or cotton-seed meal for manure. Of late, immense quantities of slaughter-house refuse, dried blood, dried intestines, and the like, and still larger quantities of the refuse left after the extraction of oil from fish, are being prepared and used as fertilizers. These ought, like the oil-cake, to be first utilized for food. The idea, though novel to most farmers, is an old one, and has been put into successful practice in many places. In its favor is the unanimous testimony of chemical composition, careful experiments, and the experience of farmers who have used the materials with success. Against it are, the difficulty of preparing wholesome materials, which can be overcome, and the prejudice that only time and trial are needed to dispel.

THE MANURIAL VALUES OF NITROGENOUS FOODS

is a matter worthy the thoughtful consideration of farmers. Nitrogen, Phosphoric Acid, and Potash are the most valuable ingredients of manure. Farmers buy them in the better kinds of commercial fertilizers at the rate of from fifteen to thirty cents per pound for nitrogen, six to eighteen cents per pound for phosphoric acid, and three and a half to nine cents per pound for potash. Cotton-seed, linseed, and palm-nut meals, bran, dried blood, meat-scrap, and fish, are rich in these ingredients. Mr. Lawes has made some calculations of the money values of the manures produced from different foods. This he does by assuming that certain percentages of nitrogen, phosphoric acid, and potash are consumed and lost, that the rest go into the manure, and that they have there about the same value, pound for pound, as similar ones in commercial fertilizers in which their value is pretty well settled. I give Mr. Lawes' estimates of the value of manure from a number of foods, and with them the feeding values, as estimated by Wolff, per table 1 ;

	FEEDING VALUE. MANURIAL VALUE.	
	<i>Wolff</i>	<i>Lawes.</i>
Cotton-seed Cake	\$41 40 per ton	\$27 86 per ton
Linseed Cake	34 40 per ton	19 72 per ton
Beans	15 20 per ton	15 73 per ton
Wheat Bran	20 80 per ton	24 59 per ton
Clover Hay	14 00 per ton	9 64 per ton
Indian Meal	22 20 per ton	6 64 per ton
Meadow Hay	12 80 per ton	6 43 per ton
Oat Straw	9 00 per ton	2 90 per ton
Potatoes	5 80 per ton	1 50 per ton
Turnips	2 20 per ton	86 per ton
Meat Scrap	55 60 per ton	—
Dry Ground Fish	46 00 per ton	—

Mr. Lawes rates the ingredients pretty high, and probably allows too little for loss in passing through the animal and in the keeping and handling of the manure. Wolff's rates doubtless require modification for our markets, and the actual worth of the nitrogenous food stuffs would come up to the valuations only where they are properly used with other foods.

In addition to the necessity for an abundance of wholesome food having in proper ratio the albuminoids and carbohydrates milch cows should have free access to

AN ABUNDANT SUPPLY OF PURE WATER.

Analyses of milk of cows show that it contains, on an average, 86 per cent. of water. This being true an abundant supply of water is necessary to a liberal yield of milk, and *pure water* is essential to the production of good milk, It has been found, however, that food containing an excess of water, or inducing the consumption of large quantities of water by cows, will cause the secretion of milk to be poor in quality. Cows should not be compelled to walk a long distance for their supply of water, nor should they be required to labor over a large area to fill themselves with grass. Moderate exercise is no doubt beneficial, but when excessive, it is at the expense of production of milk or beef. The pasturage should be such that they can fill

themselves in a few hours and then lie quietly in the shade and ruminate. Some object to

SHADE IN PASTURES

on the ground that it offers an inducement to the cattle to idle when they would otherwise be feeding, but no experienced stock-breeder or dairyman would, from any such contracted view, deprive his stock of the comfort and protection of shade during our long summer days. So far from removing the shade from pastures, clumps of trees should be left in pastures, not only for the comfort of the stock but for the pleasing effect upon the landscape.

A cow subjected to pain, worry or discomfort of any kind, cannot yield a full supply of milk of good quality.

DRYING OFF BEFORE CALVING.

Cows should be dried off a month before bringing another calf, since yielding milk and sustaining a large foetus, at the same time severely taxes their vital powers. A month should be given in which to recuperate from the tax of milk production, and in which to accumulate flesh and strength preparatory to a new period of usefulness.

Care should be taken in drying off to draw all of the milk from the udder at intervals, commencing with once in twenty-four hours and increasing the intervals until secretion of milk ceases. If a portion of the milk is left in the udder, it becomes a source of irritation and often results in the loss of a portion of the bag.

FEEDING WHILE DRY.

Many farmers make the mistake of neglecting their cows while dry, allowing them to grow poor before coming in, and depending upon feeding up after calving. This is mistaken policy which results in loss to the owner of the cows. It should be remembered that there is a severe draught upon the system to sustain the growing foetus, and while under good treatment, all animals have a tendency to fatten during pregnancy, this tendency needs to be encouraged by liberal feeding or abundant pasturage.

Good feeding before coming in so that the cows come to the pail in good condition, not only insures a good flow of milk as soon as the calf is dropped, but actually saves food in the end. Cows should be well fed while dry, and kept in good, thriving condition, but not made fat.

They cannot be expected to yield a full flow of milk and lay on fat at the same time. If in good condition when they come in, all the food given afterwards, except that required to maintain the thrifty condition already acquired, will be devoted to milk production.

Salt should at all times be accessible to cattle so that they may satisfy their cravings for it at pleasure. A block of rock salt should be placed in a box in each stall, or at some convenient point in the pasture, where they may go and satisfy their appetites at will. This is better than giving it at stated periods, or mixing it with their food. If given at stated periods, they are apt to take too much at one time; or, in their greed after it, to fight and injure each other. If given in the food there is not only risk of their getting too much and injuring themselves by drinking too much water, or of rejecting their food on account of the salt.

If too much salt is taken by cows giving milk, it will either result in their taking too much water and thereby injuring their health and impoverishing their milk; or, if relief is not found by access to water, in a reduction of the flow of milk.

SOILING

Or cutting food and feeding cattle in inclosed lots or in stalls, may be profitably resorted to where a large number of cattle must be kept on a small area.

The advantages of soiling over grazing are:

1. Economy of land. A given area will support more cattle if sown or planted in a succession of forage crops which are cut and fed to cattle either in their stalls or in inclosed lots.

2. A larger amount of manure of better quality is saved, and if proper arrangements are made, the liquid manure, the most valuable part, may be saved, and thus the fertility of the farm increased.

3. Having a uniform supply of good, succulent food, given at regular intervals, without waste of vital force by unnecessary exercise, cattle keep in better condition when soil-fed than when allowed to run at pasture.

4. They acquire habits of quietude, receive good and regular attention, and choice and abundant food, and hence yield a greater flow of milk, untainted by noxious weeds and uncontaminated by stagnant, impure water.

5. If abundant provision is made for a full succession of soiling crops, the cows receive a uniform supply of food, regardless of the weather, and do not fall off in their milk as when pastures fail.

6. The owner has absolute control over his herd and may by proper selection and judicious mating improve his stock.

7. The animals are less exposed to the influence of sudden changes of temperature and hence less liable to become diseased.

A SUMMARY.

The main points of importance in the management of milch cows may then be summarized as follows:

1. Select good cows as the first requisite for success.
2. Bestow upon them and their offspring kind and gentle treatment.
3. Feed liberally and regularly, or supply them with good pastures.
4. Provide sufficient shelters to protect them from inclement weather.
5. Provide an abundant supply of pure water.
6. Feed and milk regularly and punctually at the same hours daily.

7. Keep their stalls or milking pens scrupulously clean and free from all offensive odors.

8. Milk quietly, rapidly and gently and draw the stripings thoroughly, as they are from five to fifteen times as rich as the first milk drawn.

9. If the calf is nursed by the cow, allow it to draw the first milk from each teat and not all from any.

10. If keeping a regular dairy, wean the calves when not more than three days old.

11. Keep no more cattle than can be well fed and cared for, and let these be of good quality.

12. Grade up common cattle by the use of thoroughbred bulls of the kind best suited to the purposes for which the cows are kept. If for butter, the Jerseys; if for milk, one of the deep-milking breeds; if for combination of butter, milk and beef, the Devons.

13. Give personal supervision to feeding and milking as far as practicable.

Of course much of the above is not applicable in those sections of the State in which cattle roam *ad libitum* in the pine forests or over the mountains, and receive little more attention than to collect them once a year for the purpose of marking the calves.

CHAPTER XI.

SELECTION OF MILCH COWS—THE GUENON SYSTEM
ILLUSTRATED.

The foundation of success in dairying is involved in the judicious selection of the cows. The dairyman who is a skillful judge of cows in reference to their milk-producing capacity will have such an advantage over the unskilful as almost to preclude the idea of competition.

The importance, therefore, of conveying clear and accurate information on this subject will be appreciated by the reader, and an effort will be made in this chapter to enumerate, as concisely as possible, the principal points indicative of dairy qualities in cows.

In the space allotted to a treatise of this character, it will be impracticable to enter into minute details involving the distinctive peculiarities of the different breeds. The reader, however, may make the necessary allowance for variations arising from the characteristics of different breeds by reference to the chapter in which the different breeds and their characteristics are described.

The remarks in this chapter will be based upon the presumption that the dairy stock are supplied with abundant nutritious food and receive proper attention as to shelter, milking and gentleness of handling.

The results which might reasonably be expected from the character marks of animals will of course be modified by neglect in any of these important particulars.

As a rule, cows, to give promise of profitable yield at the pail, must have a general feminine appearance as regards form compared with the masculine appearance of the other sex.

The dairy cow should have a small head, well set upon a tapering neck. With the exception of the Devons, the horns should be small, with rather a drooping tendency. Viewed in front, there should be a gradual taper from shoulders to hips—ribs well arched, giving full play for vigorous vital organs.

A side view should present the same wedge-shape, rising from the neck to the rump, and descending from the brisket to the udder, with ample stomach and liberal capacity for the consumption of food. The udder should be large and attached well forward under the belly. The milk veins should be large, irregular in shape and knotty, entering the body through large holes. All the better if these veins ramify over the rear of the udder and perceptibly over the perineum. The skin should be loose and pliant, and covered with soft, fine hair. These points are taken in by the practiced eye at a glance, and suggest good milking properties. If added to these, we find a capacious escutcheon of upward growing hair extending well up the perineum to the vulva, and out on the lower part of the thighs, the other marks are well sustained. If on closer examination the upward growing hair, which marks the extent of the escutcheon, is found to be short and soft, and if on passing the finger nails downward over it a yellow, oily dandruff is discovered, and if the area of the escutcheon is uninterrupted, except by two bunches of downward growing, silky hair on the rear of the udder, the cow may be entered as first-class, so far as quantity of milk and continuance at the pail are concerned. If, in addition to these points, she shows a rich, yellow skin, with the oily dandruff on the escutcheon, milk rich in butter may be expected.

THE ESCUTCHEON—WHAT IS IT?

The escutcheon on cattle is that portion of the twist or space between the thighs which is covered with upward growing hair, which is usually darker and softer than that

adjacent on the thighs, which grows downward. This, in cows, commences on the front or lower part of the udder, and extends more or less out upon the thighs above the hock, and up over the perineum or space between the upper part of the thighs, varying in form and extent on different individuals.

Mr. Willis P. Hazard, the Secretary of the Pennsylvania Guenon Commission, in his book entitled "How to Select Cows, or the Guenon System Simplified, Explained and Practically Applied," says: "The hair of the escutcheon should be short, soft and fine, and the skin very soft, like a kid-glove, thin and oleaginous; and if the cow gives good, rich milk, this skin will be of a rich, golden or nankeen hue. Often, when you handle a skin of this character, the hand will feel oily, and soiled with dandruff."

THE SHAPE OF THE ESCUTCHEON.

"The escutcheon varies in shape, and Guenon named his ten classes from their shapes.

"The first class he called Flandrine, or Flanders, because it is the best, and he named it from the best cows he knew, those from Flanders or the Flemish breed, and they had more of this shaped escutcheon than any other breed; a quiet but sure proof of the truth of his system.

"The second class he called Flandrine a gauche, because although it had the Flanders shape, it was on the left flank; he called it, therefore, the Left Flanders.

"The third class are the Lisiere, or the Selvage, from its resembling in appearance a selvage, or binding of a piece of cloth.

"The fourth class are the Courbe-Ligne, or the Curve-line, because their escutcheon is lozenge-shaped, formed by a curved line which sides to the right and left, and rises to about five or six centimeters (two and a half or three inches) from the vulva.

"The fifth class he denominated Bicorné, or the Bicorn cow, because the upper part of the escutcheon forks in two horns.

"The sixth class, Double-Lisière, or Double-Selvage, has an entirely arbitrary name, and it is an odd freak of nature.

"The seventh class he called the Poitevine, or Demijohn, from a fancied resemblance to some kinds of demijohns.

"The eighth class is Equerrine, or Square escutcheon, as it is square at the upward part.

"The ninth class is the Limousine, as it was on a cow from that Province that Guenon first saw this shaped escutcheon.

"The tenth class is called Carresine, or Horizontal, because the upward part of the escutcheon is cut off squarely by a horizontal line."

In each class Guenon grades the escutcheons down from the best to very inferior. These he calls orders. For practical purposes, it is not necessary to follow him in his six orders, as cows with escutcheons ranking below the fourth order are rarely worthy of consideration. There are, however, escutcheons well worthy the careful consideration of both breeders and purchasers of cows, since they are apt to mislead the casual observer. These are what Guenon calls *Batard*, which has been rendered into English by his translators "Bastards," though the word does not clearly convey the idea intended to be represented.

The Bastards in each class have finely developed escutcheons, and soon after calving give a good flow of milk, but rapidly decline in yield when impregnated.

An illustration of the escutcheon of the first order in each class is given as a guide to those who desire to study the system, the cuts having been copied from Mr. Willis P. Hazard's book entitled "How to Select Cows." For the protection of those who wish to purchase cows or

select heifers for dairy purposes, the Bastard of the first class is illustrated and the others described.

Those who wish to study the system more in detail are advised to purchase "A Treatise on Milch Cows," by M. Francis Guenon, or "How to Select Cows, or the Guenon System Simplified," etc., by Willis P. Hazard, Westchester, Pennsylvania.

HOW TO STUDY THE SYSTEM.

The first thing to be done is to fix the *form* of the different classes of escutcheon well in the mind, associating with it the number of gallons of milk a cow of each class, of good size, well-fed and cared for should give, remembering that a large animal, other things being equal, will generally yield more milk than a small one, and keeping in view also the variations due to different breeds.

Then, the distinguishing marks of the bastard cows of the various classes must be studied. These will be explained in connection with the illustrations.

"This," says Hazzard, "must be supplemented by the careful examination of the hair and the skin of the escutcheon and the udder; of the hair, whether it is short, fine, soft and furry; of the skin, whether it is soft and close-grained, like a kid glove, thin, oleaginous and yellow or golden. For, if the hair is harsh and long, particularly on the back part of the udder, it will shorten the time of giving milk and indicates a poorer quality. The more oily or greasy the feeling of the skin of the udder and perineum is, the more it indicates good quality and richness of milk, for the oil or fat is there, showing it is the nature of that animal to give butyraceous milk. So, for the color of the skin, if it is golden it is indicative of rich milk, and the majority think it will make a finer-colored butter. There is one point more in judging by the escutcheon, and that is its size and position, and the general rule is, the higher up it is on the thighs and the broader

it is on the thighs, together with the higher and broader it is on the perineum, even up to the vulva, then the better it is. Then, remember the escutcheon has two principal parts, called the thigh escutcheon and the vertical escutcheon; the thigh escutcheon extends over the udder and the thighs, and the vertical is over the perineum or that part of the posterior which extends from the udder up toward the tail, under and often around the vulva.

“If the thigh escutcheon is high and broad, therefore very large, and extends far outward on-to the thighs, it indicates a large flow of milk. If the vertical or upper part is broad and smooth, it indicates a prolonged flow of milk.

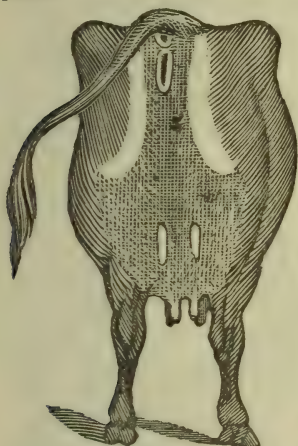
“If the thigh or lower portion of the escutcheon is narrow, the flow will be proportionately small. If the vertical or upper part is narrow and irregular, it is unfavorable to a prolonged flow.”

It should be remembered that the size and form of the escutcheon indicate the quantity of milk a cow will give; the color, oiliness and softness of the skin and the softness and furry nature of the hair, with the presence of oily dandruff on the escutcheon, are evidences of good quality. A white, dry, harsh skin, with long, coarse, bristly hair, indicate poor quality of milk.

Bulls show the escutcheon in all its forms, and, though smaller in extent, should be considered in the selection of an animal intended for the sire of dairy stock.

The outline of the escutcheon may be seen on calves only a few weeks old, and has long been used by breeders of dairy stock as a guide in selecting heifers to be reserved for dairy purposes. This is one of the most important applications made of the Guenon system, since it relieves the breeder of much expense and disappointment by obviating the necessity of waiting till the heifers drop their calves to decide which will prove profitable for the dairy. Besides, a heifer is more valuable for beef before having the first calf than she ever is afterward.

A gentleman in Virginia, who has selected his heifers for breeding purposes with reference mainly to the indications of the escutcheon, has never, in twenty-five years, had to discard one so selected after a practical test at the pail.



First-class—FLANDERS COW.
First Order.

Cows with this escutcheon are very rare. The first order of this class, if of good size, give twenty quarts when in full milk. The engraving needs little explanation. The white spots on the udder represent what are called ovals. They are small bunches of silky downward-growing hair in the midst of the escutcheon.

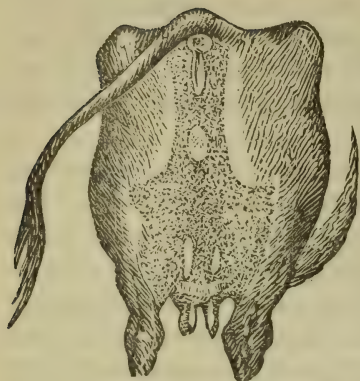
These cows never go dry.

The second order has a smaller escutcheon than the first, with only one oval, and has a tuft of downward-growing hair on the right side of the vulva from two to three inches long and from one to two inches broad.

They yield eighteen quarts of milk for eight months.

The third order has a still smaller escutcheon. They have a tuft of downward-growing hair extending around and below the vulva. They are generally without the oval. They yield sixteen quarts of milk, and continue at the pail six months.

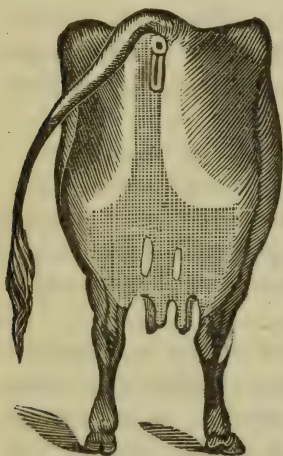
In the fourth order the escutcheon is still smaller and less regular in shape, and has a strip of downward-growing hair below the vulva, extending down five or six inches. Another peculiarity of this order is a half oval on the right thigh, extending into and interrupting the thigh escutcheon, which is lower down and much smaller than the other orders.



BASTARD FLANDERS.

There are two bastard marks of the Flanders cow :

1. A tuft of descending hair in the middle of the perineum, varying in size, usually about two inches wide and three long. The larger this tuft the sooner the cow will fail in her milk. All do no have it.
2. The interference of the ascending and descending hair on the edge of the escutcheon, giving it a bristling, bearded appearance, is another indication of bastardy. In every other respect the escutcheons of bastards of the Flanders cows are like those of the first order. They even have the ovals well developed.

Second-class—LEFT FLANDERS.
First Order.

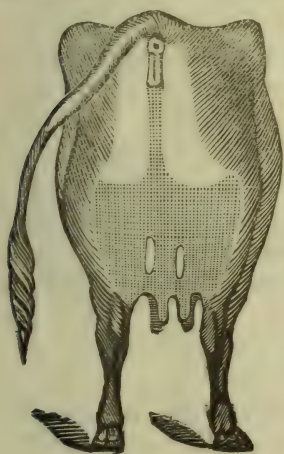
The escutcheon of cows of this class is similar to that of the first, except that the vertical escutcheon is entirely on the left of the vulva, and consequently the right thigh escutcheon larger than the left. They yield eighteen quarts and milk eight months.

The second order has a smaller escutcheon, with only one oval, and a small tuft of downward growing hair on the left of the vulva. They yield sixteen quarts and milk seven months.

The third order has a still smaller escutcheon, with a larger tuft on the left of the vulva. They yield fourteen quarts and milk six months.

Those of the fourth order have still smaller and more irregular escutcheons, the tuft of downward growing hair being longer. There are also two invasions of the thigh escutcheon—one on each side—a curved invasion on the right and an angular one on the left. They give ten quarts and continue at the pail five months.

The bastard of this class has the full escutcheon of the first order, as seen in the engraving, but have a large tuft (usually of coarse hair) on the right of the vulva.



Third-class—SELVAGE.
First Order.

This escutcheon extends well out on the thighs, terminating in an acute angle, thence descending to the vertical escutcheon, which is narrow and extends to the vulva. The engraving represents the first order. The cows of this order have yellow skins and soft and oily escutcheons. They give in full milk nineteen quarts and milk from eight to nine months.

“The second order is similar to the first, only of reduced size. It has a tuft to the left of the vulva, and only one oval on

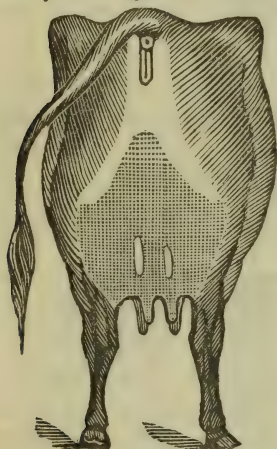
the udder on the left side. The hair of the escutcheon is generally more glossy than that around it. Cows of the second order give seventeen quarts and milk seven months.

“The third order escutcheon curves downward on each side of the vertical mirror, which rises narrowing to a point at the vulva. To the right and left of the vulva are tufts, the one on the left being the longest. On the left of the udder is sometimes an oval. Cows of the third order give fifteen quarts and milk six months.

“The escutcheon of the fourth order is of similar shape, but still smaller; but the tuft on the left of the vulva is

much larger than on the right, and there is no oval on the udder. Cows of the fourth order give twelve quarts and milk five months.”—Hazard.

The bastard of the third class has a large tuft on each side of the vulva. The rapidity with which cows having this mark decline in milk will vary with the character of the hair on these tufts and the surface covered by them. The finer the hair and smaller the tufts the longer the cow will give milk. The balance of the escutcheon resembles very closely that of the first order of the third class.



Fourth Class—CURVELINE.
First Order.

“The Curveline cows are very plenty and are of a very good grade, approaching the first-class. The escutcheon is broader than the last two classes in the upper part. Their skin is of delicate texture and nankeen shade of color on the escutcheon. The higher and broader the curved line rises toward the vulva, which it never reaches, the better it is. There are two ovals on the udder. Cows of the first order of the fourth class give nineteen

quarts and milk eight months, and sometimes up to their next calf.”—Hazard.

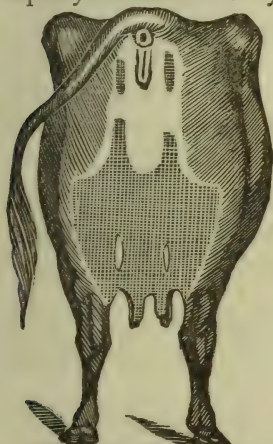
Those of the second order have smaller escutcheons of the same form as the first, except that there is a narrow tuft on the left side of the vulva. They give about seventeen quarts and milk about seven months.

The third order has still smaller escutcheons with tufts on each side of the vulva, that on the left longer than the one on the right; they give fifteen quarts and milk six months.

The fourth order have still smaller escutcheons with

larger and longer tufts by the vulva. They give twelve quarts and milk five months.

The Bastards of this class have escutcheons similar to the first order, but have large tufts on each side of the vulva. The rapidity with which they will decline in milk will depend on the size and shape and the character of the hair on these tufts. If the tufts are large and pointed and have coarse, bristly hair, they will decline very rapidly as soon as they are impregnated.



Fifth Class—THE BICORN.
First Order.

This class is not so common as the last, nor do the cows having this escutcheon yield as much milk as those of the fourth class. The illustration explains itself. Cows of the first order of this class yield seventeen quarts and milk eight months.

The second order have similar escutcheons to the first, but smaller, with only one oval on the left of the udder. The left horn of the escutcheon is larger than the right. They give fifteen quarts and milk seven months.

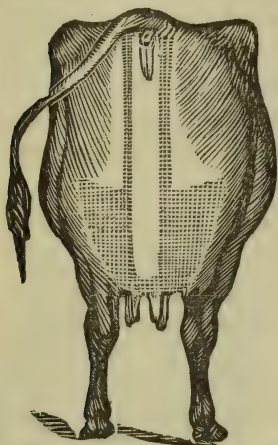
The third order is still smaller and has a half oval on the right thigh escutcheon which reduces its size. They give thirteen quarts and milk six months.

In the fourth order the escutcheon is not only much smaller, but has an angular invasion of the thigh escutcheon on the right. They give ten quarts and milk five months.

All the cows of this class have the tufts by the vulva, which increase in extent from the first order to the fourth, that on the left being longer than that on the right.

The Bastard has the tufts by the vulva much enlarged

and covered with coarse hair. In other respects the escutcheon of the bastards is similar to that of the first order.



Sixth Class—DOUBLE SELVAGE.
First Order.

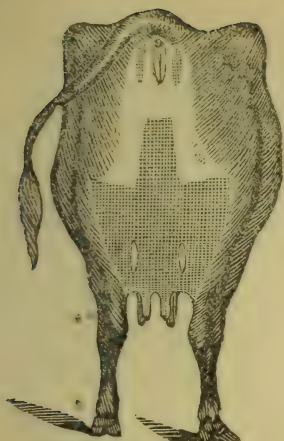
The cows of the first order of this class have a strip of descending hair reaching from the sides of the vulva to the lower part of the udder. This strip of descending hair is bordered on each side by bands of upward growing hair. As in other classes the cows of the first order of this class have a fine yellow skin over the region of the escutcheon which is covered with soft, silky hair. They give eighteen quarts and milk eight months.

In the second order the central strip of the vertical escutcheon terminates higher upon the bag, and the escutcheon is smaller than the first.

In the third order the descending belt terminates at the upper part of the udder and the escutcheon is very much smaller. The cows of this order yield fourteen quarts and milk six months.

In the fourth order the side lines of the vertical escutcheon terminates before reaching the vulva, in coarse, feathery looking hair. The outlines of the thigh escutcheon are also irregular and in size small. Cows of this order yield ten quarts and milk five months.

The Bastards of this class differ from the first only in the enlargement of the prongs of the vertical escutcheon on each side of the vulva.



Seventh Class—DEALJOHN.
First Order

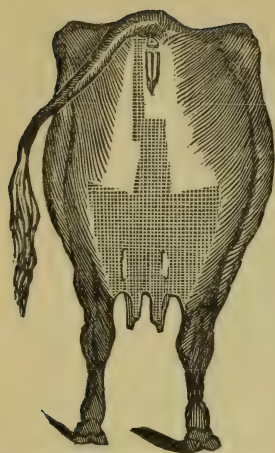
The first order of this class has the yellow color of the skin, fine hair and oily dandruff on the escutcheon indicative of good milk. The thigh escutcheon does not rise so high as in the first orders of the classes already described. Cows of this order yield seventeen quarts and remain at the pail eight months.

In the second order the escutcheon is smaller and lower down. It has one oval on the left, and the tufts by the vulva. Cows of this order yield fifteen quarts and milk seven months.

In the third order the escutcheon is still smaller, and instead of running to a point on the thighs curves down from the vertical portion, which is shorter than in the second order, the tufts by the vulva are longer than in the first and second orders. Cows of this order yield thirteen quarts and continue at the pail six months.

In the fourth order the escutcheon is still smaller and more irregular, sometimes having a triangular invasion of the thigh escutcheon on the right side. The tufts are not well developed and the hair coarse and bristly. Cows of this order yield ten quarts and milk five months.

Bastards of this class have an escutcheon similar to that of the first order except that they have the large tufts by the vulva.



Eighth Class—SQUARE ESCUTCHEON. First Order.

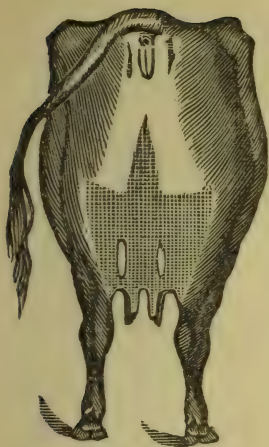
This escutcheon resembles very closely that of the seventh class Demijohn—the principal difference being found in the vertical escutcheon which turns squarely off to the left, ascending in a narrow strip to the left of the vulva. The color of the skin is good and the hair short and fine. The finer the hair the more oily the dandruff and more nearly the square approaches the vulva the better the cow. Cows of this order give seventeen quarts and continue eight months.

The second order is similar to the first, but smaller and curved on the thighs. There is a small tuft on the right of the vulva, and two ovals on the udder. Cows of this order should yield thirteen quarts and continue seven months.

In the third order the escutcheon is still smaller, has one oval, and the tuft on the right of the vulva is larger and covered with coarse hair. Cows of this order yield thirteen quarts and milk six months.

In the fourth order the escutcheon is very much smaller and irregular having an angular invasion on the right thigh, and bristly hair on the vertical portion. Cows of this order yield ten quarts and milk only five months.

The bastards of the eighth class have escutcheons similar to those of the first order, but have a large tuft of coarse hair on the right of the vulva and an enlargement of the vertical escutcheon of similar character on the left.



Ninth Class—LIMOUSINE.
First Order,

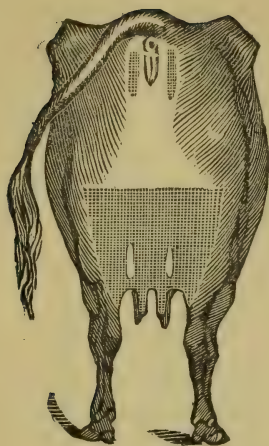
The peculiarity of the escutcheons of this class is the termination of the vertical portion in a sharp point below the vulva. It has the good features of other first orders. Cows of this order give fifteen quarts and continue at the pail eight months.

The second order differs from the first in being smaller in extent, terminating farther below the vulva, in having the points of the thigh escutcheon rounded and the tufts by the vulva longer. There is one oval on the udder. In this order thirteen quarts may be expected and a continuance of seven months.

The third order is still smaller, the thigh portion curved downward from the vertical and the tufts by the vulva longer. Cows of this order yield ten quarts and milk six months.

The fourth order is still smaller than the third, the tuft by the vulva covered with bristly hair and the left one much longer than the right. Cows of this order yield only eight quarts and milk but five months.

Bastards of this class have escutcheons similar in every respect to those of the first order, but have large tufts of bristly hair on both sides of the vulva.



Tenth Class—HORIZONTAL.
First Order.

Cows of this order have the characteristics of the escutcheons of other first orders, but have no vertical escutcheons as shown in the illustration. They yield only thirteen quarts and milk eight months.*

In the second order the escutcheon is smaller than the first, the thigh portion larger on the left than on the right. The vulva tufts are larger. There is only one oval. Cows of this order yield only ten quarts and continue seven months.

In the third order the escutcheon is lower down, smaller and more irregular in shape with a triangular invasion by the descending hair on the right. The vulva tufts are also larger with bristly hair.

The escutcheon of the fourth order of this class is very small and defective having a triangular invasion of the thigh portion on the right and one of an inward curve on the left. The tufts are large and composed of coarse, bristly hair.

The bastards of this class have good large escutcheons similar to the first order but having the vulva tufts well defined.

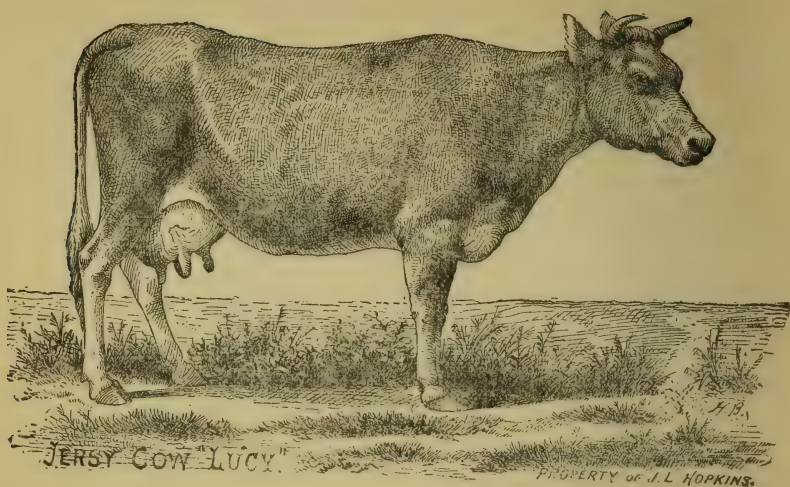
It should be remembered in reference to all the bastards that the size and form of these tufts indicate the rapidity with which the cows will decline in their yield of milk after impregnation. If they are large and pointed at the ends with coarse hair, they indicate not only that the cow will fail rapidly in milk but that the milk will be poor in quality.

The escutcheon is observable also on bulls and takes the same forms as on cows, but is of less extent. The Curveline and Limousine are most commonly met with.

Bulls for use with dairy cows should be selected with reference to their escutcheons which they transmit, probably, with more certainty, especially if thoroughbred, than do the cows.

Every farmer who cares to breed good milch cows should master this system. It is not necessary to pay much attention to the orders lower than the fourth, and hence descriptions of them have been omitted. Guenon gave eight orders.

The estimates made of the yield of the different classes and orders are based upon the supposition that the cows receive from calf-hood good attention and abundant food. If these have been neglected the actual yield will most probably fall below the estimate. As already remarked the characteristics of the different breeds of cattle must also be taken into consideration.



CHAPTER XII.

MANAGEMENT OF MILK AND BUTTER.

The first requisite, and one to which too little attention is given, is to have good, healthy cows, kindly and humanely treated. Nutritious food and pure, fresh water are absolutely necessary to the production of good milk. It is not sufficient to guard the milk while being drawn and during its subsequent management to secure purity. If the cows drink stagnant water, or that polluted by sewer drainage or other impurities, they cannot produce pure or even drinkable milk. Such water is infested with microscopic animalculæ, and the spores of fungi which, taken into the system by the cow, produce a feverish condition of the animal, and passing into the milk secretions, are drawn with the milk in which the animalculæ propagate, and the fungoid spores germinate, causing disease in those who consume the milk. Milk may be polluted also by cows breathing impure and offensive air arising from filthy stalls, or decaying animal or vegetable matter. It is not

unusual to see cows, especially in cities, leave their stalls with manure caked on their sides; such cows kept in such stalls cannot yield pure milk. Milk has been known to be tainted by cows inhaling the offensive odor of carrion exposed in their pastures. When the carrion was removed the milk, from the same cows, grazing in the same pasture, and with all other surroundings the same as before, was no longer tainted.

BAD ODORS ABSORBED BY MILK.

The room in which milk is kept should be scrupulously neat, used for nothing but milk, and thoroughly ventilated with pure air. If meats or vegetables are kept in the same room with milk it will absorb odors from them, which will affect the flavor both of the milk and of the butter made from it.

Willard, in his work on "Practical Dairy Husbandry," mentions a case which came under the observation of Mr. Lawson Tait, F. R. C. S., of Birmingham, England, in which the milk of a dairy was tainted by a peculiar smoky taste by asphaltting the floor of the dairy and the surface adjacent to it. This suggested to him that it would absorb "other things which were not so innocuous," and he instituted some experiments to test its absorbing power. He says: "I at once set going a series of experiments which have led me to the belief that milk is an extremely dangerous agent for the spread of contagion. . . . By inclosing fresh milk under bell-jars with tar, turpentine, assafoetida, feces, urine, etc., I found that in most instances the milk became impregnated with the smell, and sometimes with that intensely disagreeable sensation known as the taste 'like the smell' of the substances employed. The degree to which this was acquired seemed not so much to be in proportion to the amount employed either of milk or of infectant substance, but to the amount

and quality of the cream which rose to the surface of the milk; the oleaginous molecules seeming to act as the menstruum of contagion. This is not unlikely, when we remember that the best solvent for nearly all odoriferous principles is oil. . . . If we bethink ourselves of any instances of diseases which might in certain instances be communicated by milk, typhoid fever stands out with fearful probability."

The necessity, therefore, of pure water, clean stalls and wholesome food for dairy cows, as well as the importance of setting the milk in a pure atmosphere, free from the presence of any matter from which it could absorb offensive taints, will be appreciated.

Those having the care of milk cannot be too scrupulous as to cleanliness, not only in the apartment in which it is kept, but in the vessels used to contain it, and the water employed in cleansing them.

There are two principal systems now in use where much attention is given to dairy husbandry, viz: the Cooly and kindred systems in which the milk is set in deep pans, immersed in cool water, and the Furguson plan, in which a cool current of air instead of water is used. Neither is practicable in the South, under ordinary circumstances, since ice is required in each system.

Those who have cool springs conveniently located can use the Cooly system. There has, of late years, been much discussion in the Agricultural press upon the merits of these systems, and the appliances used in each have received from year to year such improvements as the experience of practical dairymen have suggested, until now they seem to have almost reached perfection.

The relative merits of deep or shallow pans for raising the cream have also been freely ventilated through the agricultural press, but the advocates of the different plans have viewed the matter from such widely different stand-points that often both have been right when their sur-

roundings have been ascertained, while both were wrong in endeavoring to insist upon the universal adoption of either system regardless of surrounding circumstances. In this, as in every other department of husbandry, one must be controlled, to a large extent, by the surrounding circumstances. In the South the deep pans may be adopted to advantage by those who have spring-houses, or who have their dairies adjacent to wells of cool water, with appliances for running the water around the milk at short intervals of time. In the absence of these conveniences, a cool basement-room on the north side of the house into which the cool morning-air is admitted and from which the heated noon-air is excluded, but with ample ventilation from above, will probably give most satisfactory results.

The sub-earth ducts by which a cool current of air is conducted for some distance under the earth into the dairy and the warm air conducted out through the top, the current being induced by a heated fire, or large lamps at the top of the dairy, if on a small scale, have been successfully adopted in some localities. The air is cooled and purified by its passage through the sub-earth ducts, and enters the dairy cool and fresh, and is constantly renewed by the removal of the warm air from above.

On ordinary farms in the South, so little preparation is made for the care of milk that it cannot be said that any system prevails, either as to arrangement of dairies or as to the manner of setting the milk.

If the surroundings are such that the milk is necessarily exposed to a high temperature, and consequently sours in a short time, shallow pans are best, since they admit of a more prompt rising of the cream. If a low temperature can be maintained, the deep pans are more convenient. Milk should be set as promptly as possible after it is drawn, since if the cream has begun to rise before straining, it is re-mingled with the milk, and will not so readily separate itself again.

WHAT IS CREAM, AND WHY DOES IT RISE TO THE SURFACE?

Cream is an aggregation of globules of oily matter, varying in size in the milk of different breeds of cattle, as well as in the milk of the same cow. These globules contain the butter inclosed in sacs. They, having less specific gravity than the watery parts of the milk, rise to the surface, the larger ones first, and the balance in the order of their size, the smaller rising last. In the milk of Jersey cows the globules are larger than in that of those of other breeds, and hence the cream rises more promptly in the former than in the latter. In the milk of the same cow, however, the globules differ in size. The larger ones having a greater quantity of the oily matter in a body are lighter, and hence rise first. In deep pans this arrangement of the globules in the cream in the order of their size is more complete than in shallow pans.

CHURNING

Is simply such an agitation of the cream separately, or of the cream mingled with the entire milk, as will rupture the enveloping cases of these globules, liberating the oily particles, which, cohering to each other, "collect" and form butter. The globules in Jersey milk, being larger than those in other milk, and the encasing sacs more tender, it requires less agitation and a shorter time to get the butter from it. The globules also being more uniform in size, the butter "comes" more nearly all at once, and hence there is less risk of over-churning, and the grain is better preserved.

In milk in which there is greater difference in the size of the globules, the larger ones are ruptured some time before the smaller ones, and hence the grain of the first that "comes" is destroyed by over-churning before the oily matter is liberated from the smaller globules.

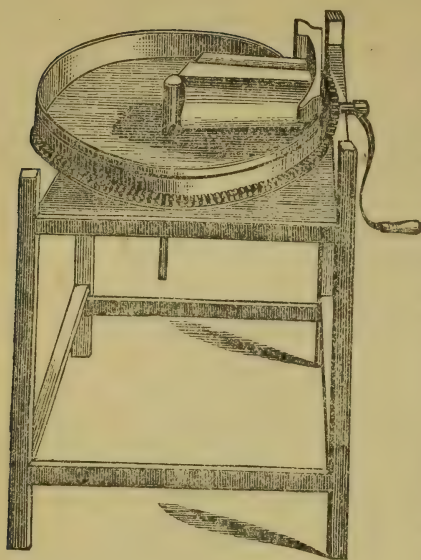
The same effect is produced by churning old cream with new. The sacs of the older cream are more tender, and are ruptured more easily than those of the new, and, as before, over-churning occurs.

The same effect is produced by too rapid churning, or by the use of dashes with cutting edges, such as the turbine wheel dash, perforated tin funnels, etc.

Avoid all dashes and churns which claim to get butter from new milk in five minutes. While this is possible, the texture and consequently the quality of the butter is injured.

To secure good results in butter, milk should be kept at as nearly a uniform temperature as possible, and should be neither too warm nor too cold when churned. If too cold, it will foam, and require long churning to get the butter; if too warm, the butter, when it "comes," will be too soft to gather and of poor quality, both as to color and texture. From 65° to 70° F. is the best temperature that can be attained in this climate, under ordinary circumstances, and one at which churning is easily done.

Butter is often injured by over-working after it is taken from the churn. When this is the case, it has the same clammy and tallowy texture that results from over-churning. The grain is destroyed by heating or excessive working, especially when it is warm during the operation. The only object in working butter at all is to free it from the milk that becomes entangled in it during the processes of churning and collecting it. There are various mechanical appliances in use for removing the milk from butter, some of which are highly recommended by practical dairy-men.



That represented by the accompanying illustration is in use in some of the largest Jersey dairies in this State, and is perhaps the best in use. It effectually removes the milk without injuring the grain of the butter. There is no excuse for the production of white or inferior butter in Georgia, if the proper food is provided for the cows, and milk and butter are correctly managed; yet "country

butter" in our cities is almost synonymous with poor butter, especially during the winter. With our facilities for providing green food for cows during winter, our best butter should be made then, and is in some dairies, which are carefully and judiciously managed.

So rich and yellow was the butter from the dairy of Mr. J. B. Wade, of DeKalb county, last winter, that purchasers objected to it on account of the color, suspecting the use of artificial coloring matter.

The use of annatto for coloring butter is quite common in Northern dairies during winter when green food cannot be had for the cows. This is a red coloring matter obtained in South America and the West Indies from the pulp surrounding the seeds of the annatto tree (*Bixa orellana*.) It is considered perfectly innoxious, but since it adds nothing to the flavor of the butter, and is used to impart the appearance of first-class butter to what is in reality an inferior article, it is a species of deception which, to say the least of it, is not commendable.

OLEOMARGARINE

Is an imitation of butter which so nearly resembles it in appearance as to deceive the unsuspicious. Large quantities of it are sold as butter without detection, even by the consumer. It retains its consistency under a warm temperature better than butter, and hence bears shipment better and keeps longer. Analysis shows it to contain substantially the same ingredients as pure butter and to possess no properties deleterious to health. Recent experiments with this compound, however, show that it forms an emulsion less readily than pure butter, and hence is supposed to be less readily absorbed by the system.

If sold as oleomargarine, there seems to be no reasonable objection to its sale; but if sold as pure butter, as is generally the case, a fraud is perpetrated upon the purchaser and consumer which should be punishable under the law.

It can be detected very readily by the peculiar odor derived from the oil of tallow used in its manufacture.

The fat of beeves is ground or finely cut by machinery made for the purpose, and then subjected, in steam-heated vats, to a temperature of 150° F., causing the greater part of the fat to separate from the fibre and rise to the surface. This is drawn off with a syphon into a water-bath, and salt added to hasten clarification. It is then drawn off, and allowed to solidify somewhat. It is then pressed, the part remaining, being principally stearine, is rejected; the part which flows off is churned with milk to impart somewhat of the flavor of butter to it, and then seasoned with salt and colored with annatto. The whole process of manufacture is cleanly and the product an excellent imitation of butter, and if fresh, healthy fat is used for its manufacture, it contains nothing injurious to health. Vegetable oil, such as pea-nut oil, is sometimes used in its manufacture, when much stearine is retained, for the

purpose of reducing its melting point more nearly to that of pure butter.

KEEPING BUTTER.

A cheap and effectual method of keeping butter through the winter is as follows: Work the milk from the butter as thoroughly as possible, pack firmly in stone jars, cover with an inch of fine salt even with the top of the jars, tie a cloth tightly over them, and invert in a cool, dry room. The butter thus packed in September will be perfectly fresh and sweet when opened in spring. Another plan practiced by some is to wrap pound packages in cloth and immerse in sweet brine made of strong salt.

A Virginia lady writes: "I have tried two methods of keeping butter successfully from September to the following May or June; one by packing in stone jars, covering an inch deep in salt, binding a cloth tightly over it, and turning it upside down. The other is to tie each churning in a clean cloth and drop it into brine, keeping it well pressed under. This brine must be as strong as it can be made—boiled, skimmed and strained. In either of these methods the butter must be pure to keep well. It is such an absorbent, it is all important to keep it free from all odors, and to have all vessels in which the milk is kept or in which butter is packed kept exclusively for that purpose. Butter must of course be well worked, taking care not to break the grain. If the grain is broken it will not keep at all. The brine effectually excludes the air and keeps the butter in exactly the same condition in which it was put away. If some rolls have less salt than others, they will not be altered by the brine, as one would suppose. I prefer this method to packing in stone jars—it is more reliable and far less trouble. If wooden vessels are used, they should be of oak."

If, however, dairy farms are properly managed in Georgia, there will be no necessity for packing butter for

winter use. Winter dairying, with our facilities for producing green food during the entire year, should be made a specialty, and "gilt-edge" butter sent from Georgia to the Northern markets.

This will be further discussed in the chapter on "Grasses and Other Forage Crops."

CHAPTER XIII.

HOW TO JUDGE A BEEF—BUTCHERING, AND HOW IT SHOULD BE DONE. CORNED BEEF—COOKING BEEF, ETC.

It is important that those who sell as well as those who buy should be able to judge of a beef on the hoof. There are certain points which indicate the degree of fatness and the quality of the meat, a few of which will be noticed. As remarked in the chapter on the different breeds of cattle, beef-producing qualities vary with the breed. Like capacity for milk-production, that of beef-production has been developed by careful selection and breeding. The Texas steer or one reared on "the range" in Georgia, contrasted with an improved Short Horn or Hereford ox both as to size, form and quality of the meat, illustrates better than any description can, the wonderful improvement wrought by skillful selection, breeding and feeding. In the former the flesh and fat are taken on irregularly, and often as otherwise in the less desirable parts of the carcass, while in the latter they are more uniformly distributed and placed principally on the most desirable parts. It is economy, therefore, if beef is the object of the breeder, to select one of the early maturing easy fattening, beef-producing breeds, since they give more and better beef for a given quantity of food than the slow-growing, less compact kinds. For beef animals in

Georgia a cross of a Short Horn or Hereford bull on the common cow will give fine results. Many who will read this are familiar with the influence of such a cross on the native cows of a neighborhood in the improvement in the size and appearance of the cattle. The effects of such a cross made in Hancock county in 1861-'62 and '63 are still visible.

The ratio of flesh to "offal" determines the true value of an animal for beef purposes.

The body of a properly formed beef animal, when thoroughly fattened, should, to use Allen's expression, "be nearly an oblong square." In such an animal there is very little "offal" compared with the valuable parts. Such form implies well-arched ribs, giving ample chest capacity for the accommodation of full lungs and sound digestive organs, broad hips, a well filled twist, a heavy brisket and full flank.

The hind quarters furnish the most valuable part of the beef—such form implies full development of these parts with small bone, well-rounded hams, marbled flesh, and a uniform distribution of fat over the entire carcass.

An animal with a narrow, flat chest, long legs, small hips, heavy head, large bone and flat hams will prove profitable, neither to the breeder, grazier, the butcher nor the consumer. Few animals with large head and large bone and flat hams will prove profitable feeders or good beef, while one with small head, fine bone and a flexible skin will generally fatten well and yield tender, fine-grained, juicy beef. Experienced judges of cattle rely much upon what is technically called the "handling" which has reference to the "feel" of the skin and the flesh immediately under it. A "hard handler," says Allen, "is one with a tight, close skin, with little or no yielding of the flesh beneath; a "soft" or "good handler" denotes an elastic or springy touch, both skin and flesh yielding, like a small, hollow India-rubber ball, to the pressure of the

fingers, and the skin easy of movement over the flesh—not *flabby*, as is sometimes the case with a very thin-skinned and sleazily made-up animal. A ‘hard handler,’ denotes a bad and slow feeder, and tough meat. A “soft” or “good handler” denotes tender, juicy meat, and a quick, profitable feeder.

To the eye there are also certain points which reliably indicate the degree of fatness and the quality of the meat. Besides the size and fineness of the head and bone, the following points should be carefully noticed as indicating a high degree of fatness, and being well developed only on well fattened cattle. These are the roll back of the shoulder, shown as the animal walks, a plump and “well let down” flank, full twist or “breeching,” as sometimes called, and, if a bullock, a full, round cod. Rolls of fat on each side of the root of the tail also indicate an advanced stage of fatness. The ribs of a very poor ox show prominently, those of a moderately fat one show but little, while those of a very fat animal appear prominent on account of the accumulation of fat on the outside. A careful observation of these points, together with the ‘handling’ and general square, plump form of the animal will rarely deceive one in judging a fat beef.

BUTCHERING

Should be understood by every farmer, whether he expects to perform the operation himself or not, since under our system of labor, with the frequent changes occurring in the labor employed on the farm, the farmer can have no assurance that he will have in his employ a man who knows how to butcher a beef.

It is not proposed to give detailed directions for butchering but simply to make a few suggestions which may be of service to the inexperienced. The best way to learn how to butcher is to assist an experienced butcher in the performance of the operation, observing closely every part of the process.

The animal to be slaughtered should be prepared for it by a fast of twelve or eighteen hours in order to relieve somewhat the distention of the intestines, and thus facilitate their manipulation.

It matters not whether the axe or the rifle be used for killing, provided it be so executed as not to injure the flesh of the beast, and provided the knife is promptly used on the neck veins to insure thorough bleeding, and the animal be placed in a position favorable to the effusion of the blood. As early as possible after the bleeding the hide should be stripped from the hind legs, a gambrel inserted and the animal hung up. The practice of skinning on the ground is a slovenly one and seriously injures the appearance and quality of the meat so slaughtered. If one has not a scaffold with rope and windlass, a stout pole, with one end resting on the ground and the other in the fork of a tree, on a side hill, will answer very well. Have the beef to drop with head down hill at the end of the pole, and as soon as ready slip the gambrel up the pole until the animal swings. If no suitable tree stands on a side hill at a convenient distance from the farm-house, a fork or post may be substituted. The utmost neatness should be observed in the preparation of the meat, which should not be cut until cold and firm.

When beef is butchered in cool weather, say in December, so much of it as is intended for steak may be hung in a cool place without salt, and steak cut from it as needed, rubbing a little dry meal over the freshly cut part to prevent drying and crusting. The longer the meat hangs without salt the more tender the steak will be. Salt hardens and toughens meat, and should be used on beef only when necessary for its preservation. No matter how well fattened beef may be, or how carefully and neatly butchered, steak must be cooked well to be eatable. A poor steak well cooked is better than a choice one poorly prepared. *Broiling steak* is a very simple process and yet we

rarely find a properly broiled steak on either public or private tables.

The too common practice of pounding or chopping steak for the purpose of making it tender has the effect of depriving it of its juices, its very essence, leaving only the fiber of the cellular structure. The prime object in broiling a steak should be to preserve the juices in the steak itself, and not in the gravy. Pounding steak before cooking, and then extracting its juices into the gravy, to be used with it, reminds one of grinding apples, pressing out the juice and then pouring the cider over the pulp to season it to make it palatable. The gridiron was formerly used exclusively for broiling steak, but this is by no means necessary. An ordinary pan will answer quite as well. Place the pan on the stove until quite hot. Cut the steak of uniform thickness—from half to three-fourths inch—lay it in the pan, using care to have every point of it come in contact with the hot pan, and turn rapidly to avoid burning. Have butter, pepper and salt in a hot dish at hand—with a little of this baste the steak when nearly done to increase the flavor if desired, or simply lay the steak in the dish and with a spoon pour some of the butter over it. The object in having the pan hot when commencing to broil the steak is to sear the outer surface to coagulate the albumen, and thus prevent the escape of the juices. Rapid turning is necessary to prevent over-cooking the outside before the interior is sufficiently done. When “rare done” the inside of the steak will be red, but when cut no blood will escape. At this stage it is more tender, better flavored and more digestible than when cooked more. The best steak will be tough if cooked slowly. The ordinary method of frying beaten steak with lard destroys the flavor of the steak, and renders it less digestible than when properly broiled.

In baking or roasting beef, it should be subjected at first to a high degree of heat, as in broiling steak, to coagulate

the albumen of the surface to prevent the escape of its nutritious fluids; this done, it should be subjected to a slow heat until the interior is cooked to redness, but so that the juices which escape when cut will not be tinged with blood. A little water should be put into the pan in the commencement of the operation, and the surface of the meat basted repeatedly during the progress of the cooking, with the gravy from the pan or oven. When the slow heat is applied "dredge" the meat with flour to serve the double purpose of closing the pores of the surface and of imparting a pleasant brownness to the meat when cooked. Roasting and baking are used to indicate the same process, the only difference being the exclusion of air in the latter and its admission in the former process.

If fresh meats are to be boiled they should first be immersed in boiling water for a few minutes, and then cold water added to reduce the temperature to a mere simmering, which should be continued until the meat is done. The usual rule as to time is twenty minutes to the pound of meat. The scum that rises to the top while boiling should be removed. In boiling meat to be eaten as such, we desire to retain the juices as much as possible in the meat, and hence it is first immersed in boiling water to coagulate the albumen of the surface. In boiling for soup we desire to extract the nutritious juices *from* the meat, and hence it is put into cold water over a slow fire, and gradually brought to the boiling point. If vegetables are used in the soup, they should be boiled separately and added to the soup before it is done. If put fresh into the boiling soup they will be toughened and will not boil to pieces. The head and hoof of beeves are thrown away by some, while by others they are highly esteemed. Several choice dishes may be made from the beef's head. If boiled thoroughly and cut fine, it may be made into pies or stews, or placed in a dish with bread crumbs on top and thoroughly browned. These dishes are seasoned

with pepper, salt and perhaps a little onion to suit the taste, and are both good and economical. Another dish is made from it by chopping it fine, and mixing it with some cold ham—fat and lean—bread crumbs and an egg or two. Knead them well together, form into round or oval balls, roll in a little flour and fry a light brown. The head of a large beef will not cost, at most, more than twenty-five cents, and will supply an ordinary family for several days with choice dishes.

The feet nicely dressed and thoroughly boiled (besides making nice neats-foot oil) if cut up fine, rolled in flour and egg and fried, make a choice dish. For making soup, no part of the beef is equal to the tail.

CORNERED BEEF

Should be in the store-room of every farmer's wife during winter and spring. An experienced housekeeper of Virginia sends the following recipe for preparing it: "Salt the beef as usual, adding a "pinch" of saltpetre to each piece. Let it remain in salt three days, drain off the bloody brine formed by the salt, and wipe each piece with a clean towel and re-pack in the tub—a syrup or molasses cask will answer. For the brine, take as much water as will cover the beef and add salt until it will no longer dissolve it, a tea-cup of ground saltpetre and a quart of molasses, or its equivalent of brown sugar. Boil this and skim well. When entirely cold, pour over the beef and keep it well pressed under the brine. These proportions will answer for 200 pounds of beef. Should the brine mould in warm weather, re-boil and skim, adding half pound of bi-carbonate of soda, and when cold return to the beef. Corned beef should be boiled until the bones can be taken out and allowed to cool in the liquor in which it was boiled. It should not be cut while warm." Pieces of the beef which would be inferior if cooked while fresh make delicious meat when corned by this recipe.

The "round of beef," or a piece cut from the thigh where the best round steak is taken, cutting entirely through with a thickness of six or eight inches, makes when corned by the above recipe a delicious dish either boiled and eaten cold or broiled with butter and pepper.

CHAPTER V.

SOME DISEASES TO WHICH CATTLE ARE SUBJECT IN THE SOUTH.

There is probably no country in the world in which cattle are more exempt from disease, or in which they are subject to so few diseases, as in the South. In colder climates where it is necessary to protect cattle in warm houses during winter, they are liable to many serious complaints almost unknown in Southern herds, such as consumption, pneumonia, and other diseases resulting from climatic influences, and defective ventilation in the barns in which they are kept in winter.

A full discussion of the diseases of cattle cannot be had in a single chapter of a work limited in scope as is this by the small fund which can be devoted to printing, nor is such full discussion necessary in a work prepared especially for Georgia farmers, who will be better served by confining the discussion to diseases which are likely to occur in their herds.

RED-WATER

is the only disease which is at all fatal to cattle in Georgia, and hence the larger part of this chapter will be devoted to its discussion. Fortunately for the objects in view, this disease has recently prevailed in some of the finest Jersey herds in the State, and has received at the hands of the Jersey breeders the most careful attention.

Advantage is therefore taken of their so recent experience and observation, the results of which are given for the guidance of others whose herds may in the future suffer from the attacks of this our most fatal cattle disease.

At the request of the Commissioner of Agriculture, several gentlemen who have had practical experience with this disease have given the results of their experience and observation for the benefit of the farmers of the State.

In July last this disease broke out in the choice herd of Jerseys, of Maj. W. B. Cox, of Atlanta, on his farm in De Kalb county. Under date of Sep. 1st, 1880, Dr. H. L. Wilson, who attended Maj. Cox's cattle, writes:

"At the request of Maj. W. B. Cox, I give you some facts relative to the recent sickness in his herd of Jersey cattle. Immediately succeeding the heated term in July, his cattle that were then at the pail, began first to decline in milk and in from twelve to twenty-four hours refused to take food. With drooping heads they stood in a drawn position evidently in pain. The urine was quite red at first, hence the common name of the disease, "Red-Water"—and continued to deepen in color until it was like port wine, just before death.

"After he had lost one or two, I went out to his farm to endeavor to assist him, if possible, in saving the balance from death. I had a post-mortem examination and found the last stomach in a high state of inflammation, extending through the duodenum, or first intestine. The gall-bladder was distended until it was as big as a large cocoanut, the bladder almost ready to burst from distention with bloody urine.

"The kidney, and in some instances, in subsequent post-mortems, the liver, was congested.

"His herd had been grazing on a very rich bottom, covered with clover and grass. My opinion was that the succulent feed that was in a high state of development, and the excessive heat were the causes of the trouble. I

therefore advised active purgation; but all attempts at thorough purging failed, save in one animal. I gave salts and lard freely, but with no good results. One cow, *Optima*, the queen of his herd, was powerfully purged, and directly afterwards I ordered fluid extract of ergot, one ounce, and spirits of turpentine, two teaspoonfulls, given with drench of flax-seed tea and lime-water. She continued to improve and is now well, but *seven others died*. Now, remember that all of those that died failed to purge, and died in from twelve to thirty-six hours after failing to give milk or to eat. Immediately after this sickness, Maj. Cox removed all of his stock to a highland pasture, in which there is plenty of shade and a spring branch. Here they did well until the last week in August when seven more were attacked in the same way, two of which died, making his loss within a few weeks amount to nine in number. Now, is it epidemic, or heat, or excessive feed in damp low-grounds, or what is the cause? I am informed that quite a number of cattle have been similarly attacked and have recovered, but I do not believe that they could have been so malignantly sick as those I saw. I am satisfied that unless actively and promptly purged they invariably die."

Mr. J. B. Wade, under date of Atlanta, Aug. 26th, 1880, writes:

"During last year and the year before, nearly all of my Jerseys at 'Oak Shade Farm,' in DeKalb county, were sick. As all of them were brought from the North, I think the sickness was caused by a change of climate. None have, as yet, had a second attack. The first case occurred in July, the last on the 29th of October. The symptoms among those of mine that were attacked, were all similar in their characteristics, and were so marked that the most inexperienced person would not fail to detect the sick animal. In the case of milch cows, the first symptom noticed was a total cessation of milk secretion. In

every case the animal would lie down with its neck stretched forward, under jaw resting on the ground, ears drooped, eyes half closed and running water, a clear, ropy discharge from the nostrils, no 'sweat' on the end of the nose, which an animal in good health always has, a constant gritting of the teeth. The worst cases would utter a low, plaintive moan and seem to be in much pain, and would offer no resistance when drenched or injected. If standing, the back would be drawn up and the head drooped. A rapid emaciation begins with the commencement of the disease. With the exception of one or two cases out of probably twenty, obstinate constipation was a symptom. Two cases began with bloody urine, but with all the others this was an after symptom. In every case there was high fever, quick pulse and hot, dry skin.

"To move the bowels as quickly as possible was my aim. To effect this I gave a cow a quart of lard, warmed sufficiently to liquify it, and immediately followed it with a quart of flax-seed tea. If there is no action from the bowels in two hours, repeat the dose in smaller quantity, say one pint—if still no effect from the lard, in four hours more give another pint. I gave a quart of flax-seed tea every two hours until four or five doses were taken, I injected the first cases I had with soap-suds, but do not think this did any good.

"In cases of constipation, the first operations will be very compacted, hard, dry and black, and in small quantity. For this I did not stop giving the lard, but continued it in pint doses 'till the feces became softer, of lighter color and more copious. Then another trouble began. When the lard did take effect it would produce a violent case of the scours, and if the cow was with calf this would produce abortion. Several persons told me that Epsom salts should have been substituted for the lard, and I tried it in a few cases but found it was slower in its effects, and so went back to the lard, thinking it better to lose the calf than to let both die.

"The object of the flax-seed tea was to operate on the kidneys, and in every case, at the beginning, this was given whether they had bloody urine or not, and when they did have it, I continued to drench with the flax-seed tea till the urine changed from the bloody color. When the attack was broken and they began to convalesce, the first food they were given was two or three pieces of dried beef, the size and length of the little finger. The first piece would have to be forced into the mouth and held there till they chewed and swallowed it. After that they would follow around for more. They were given a few pieces of the beef several times a day for two or three days, or until they had an appetite for bran and hay. The beef is an appetizing and nutritious diet. Every case I had recovered and in two or three weeks, they were as fat as ever and livelier than they were before they were sick. I should have mentioned that I gave them shorts or bran with a very little ground flax-seed as soon as they would eat. If much flax seed is put in the bran they will not eat it. I have had only one case of an animal being sick that was to the 'manor born,' and that was a calf three months old. He had no 'Red-water' symptoms, but in all other respects was sick just as the others were."

Judge John L. Hopkins, whose stock farm is near Atlanta, in Fulton County, under date of September 2, writes:

"Immediately after Major Cox's losses from the disease called 'Red-water' I reported the cases to the *National Live Stock Journal* and also to the *Country Gentleman*. The matter was referred by the *Journal* to Dr. Paaran and by the *Country Gentleman* to Dr. Moore, both of whom are educated, competent veterinary surgeons. I enclose their replies. Dr. Paaran's prescription was received first, and I used it mainly, but Dr. Moore's was used also, both with satisfactory results. I had in my herd five severe cases, four of them my very choicest animals. They were

all saved, and undoubtedly it was accomplished by this treatment. It should be understood that death cannot be averted unless the disease is promptly and courageously met at the start. A few hours' delay and death is almost certain. I inspect every animal on my place twice a day, and all during the day they are under the eye of Mr. Martin, the herdsman. The very moment that a change occurs it may be observed. The practical, observant man, who is familiar with his cow, can tell in an instant whether there is anything wrong with her just as certainly as he can say whether it is joy or sorrow that is depicted in the countenance of a familiar friend. When that change comes it must be met then and there, as it will be too late. Should the flow of milk fall off suddenly, without a known cause, such as fright, excitement, etc., or should the appetite fail, do not wait for more, it is safe to resort to the remedies at once. The linseed tea should be made from the seed unground, to be sure that it is pure, and the tea should be as strong as it can be made. Let the portion be over rather than under a quart, and let the medicine be administered by the watch. A negligent or unfaithful attendant will be of no service. With the first discharge of red water the animal appears to almost let go of life, and then, after the bowels are moved, the hope lies in linseed, the gentian and iron. Drs. Paaran and Moore unite with others in attributing the disease generally to low land or inferior pasturage, and that may throw some off their guard. Helga—one of my cows, and the very queen of Jerseys—had the disease, and hers was one of the most stubborn cases. About three weeks before she took sick she slipped a horn. She was tethered in a lucerne field, within reach of the shade of some apple trees. The tether was moved from day to day, and she was kept on that purest and best of pastures, lucerne and crab-grass. She was given bran, and had oil-cake also. The other cattle were fed freely on green corn, bran, oil-cake and cotton

seed meal, and ran on young orchard-grass pasture. I am satisfied that Helga was gorged with her green food and the others with the green corn. I at once purged every animal on the place, and let them down for a few days from the high feeding, and then gradually and cautiously returned to a proper diet. The disease has not re-appeared."

Dr. Paaran's reply to Judge Hopkins' inquiry, taken from the *National Live Stock Journal* of August, 1880:

"According to the description, the disease from which the cows died was no doubt the so-called Red-water. It is stated that the cows were kept in a low meadow, with high and rank grasses. Such land, besides containing coarse and innutritious grasses, very frequently contains also plants or shrubs possessing acrid, bitter or astringent principles. The consumption of such herbage in unlimited quantities is often productive of serious disorders, and especially of irritative fever and inflammation of the urinary organs. We are requested to suggest preventive and corrective measures. Prevention consists in discontinuing the use of such grounds for pasturage and removing the animals to grounds, preferably higher ones, and which contain no deleterious herbage. In the beginning of the disease a purgative dose should be given, consisting, according to the age of the animal, of from one pound to a pound and a half of Epsom salts dissolved in a pint of hot water, to which has been added a pint of treacle (molasses). Also give, every hour, a quart of linseed tea, besides injection, per rectum, of linseed tea. When the bowels have been attended to, stimulants and tonics should be administered, to counteract the prevailing great lassitude and weakness, such as an ounce each of aromatic spirits of ammonia and compound tincture of gentian, or an ounce each of compound tincture of gentian and tincture of per-chloride of iron, either of which should be given in a pint of cold gruel or linseed tea, and repeated

every two or three hours. Give all the linseed tea the animal will drink, and feed on gruel or steamed or boiled food."

The following inquiry by Judge Hopkins and reply by Dr. Moore are taken from the *Country Gentleman* of August 12, 1880:

RED-WATER IN CATTLE.

"A terrible cattle disease has recently been prevailing here. Its first symptom is the passage of red urine and the discharge of matter from the nose that scalds the skin of the nostril. As the disease progresses the urine turns darker, and when, finally, it gets dead black, there is no escape from death. The cows were sick two or three days. They had every possible attention, and every known remedy was applied, but to no purpose. One of the cows was cut open after death, and it was found that her bladder contained over a gallon of perfectly black water. The poor things appeared to suffer terribly, but could not be roused from a dull sort of stupor that seized them after the disease had fairly taken hold. The disease is not contagious or infectious, nor is it confined to Jersey cattle or to any sort of fine cattle. There are many common cows that have died of the same trouble. What is it, how should it be treated and how may it be prevented? We greatly need a competent veterinary surgeon—an educated, experienced, skilful man. Such a person would do well here. A large amount of money has been invested in Jerseys in this county, and we are full of anxiety. The herds have all been doing well.

J. L. H.,
Atlanta, Ga."

ANSWER BY DR. EDWARD MOORE.

"Hæmo-albuminuria, black water, bloody urine, red-water, etc., are among the titles given to a disease of cattle, characterized by the color of the urine, which, accord

ing to the stage of the disease, is red, coffee-colored or black. It is loaded with albumen, and contains considerable coloring matter from the blood. It is non-contagious, but, owing to the fact that its immediate cause is to be found in the nature of the food which the animals receive, and inasmuch as oftentimes a large number are fed alike, consequently the majority are stricken down with this terrible disease. Those who do not understand it are apt to look upon it as contagious. Food containing flesh and fat-forming matters in small proportions, with excess of water, is the great factor in the commoner form of this disease, and unquestionably the case in the instance before us. It is a much rarer disease in this country than on the Continent or in Great Britain. It follows bad weather, and results from inferior pasturage—inferior both as to quantity and quality. The same may be said of roots; that is, those poor in quality are known to be productive of this disease. The blood is thus robbed of its richness and purity, and in consequence some of its components, which are unfitted for the performance of their natural functions, are excreted in large quantities by the kidneys and with the urine gain exit from the body. The vital fluid (the blood) thus impoverished is not capable longer of keeping up the tone of the system, and various organs give way to disease; and, depending upon the particular ones which sympathize, we notice peculiar symptoms. The liver, intestinal canal and kidneys are usually affected largely, often followed by brain sympathy. The heart is also very abnormal in action, owing to the changed condition of the blood. There is another form of this disease, which sets in about a week or two after parturition, but it is not necessary to speak of that now. In the treatment we find that a knowledge of the cause is necessary in order to render either prevention or treatment rational. To prevent it should be the first aim, and this indicates a study of the condition of pastures, seasons and weather;

land undrained, low and wet, rank, innutritious food and roots grown on rich, moist lands should be avoided, and the disease will disappear. Remedial measures for those affected are often unsatisfactory, for the reason that animals become so anæmic and prostrated before they receive any treatment that it is of no avail. Give them, in preference to quack nostrums and drugs, large quantities of blood or albumen in the shape of eggs beaten up with milk, giving also something to strengthen the system weakened by the causes enumerated. We can now suggest, with a hope of success, a line of treatment simple and complete: Give daily for several days from a pint to a quart of raw linseed oil, even if diarrhœa is present; chlorate of potash, 3 dr., in water thrice daily; chloride of sodium, 6 oz.; powdered capsicum, 1 dr.; powdered gentian, 1 oz.; and sulphate of quinia, 30 gr., twice daily. Without skilled treatment the fatality is very great."

Col. Richard Peters, says:

"My first experience with Red-water was in 1856 and 1857. I had collected from all parts of the United States and from England a herd of 100 head of thoroughbred North Devon cattle, with a few of the Durham and Ayrshire. My improved Devons from England cost nearly \$500.00 per head. I had sent three of them to my farm in Gordon county, and retained three of them in Atlanta, keeping them stalled, or in the shade. They reached America in February or March.

Those at the farm ran in the fields with the other cattle. Early the following August the Devon bull was attacked with Red-water. He was drenched with 1½ lbs. of Glauber salts and some spirits of turpentine. In about three days he died—not then knowing he had the Red-water. About the last of August other cases appeared and at the same time my English cattle at Atlanta were taken. I used freely salts and spirits of turpentine on the entire herd, both at the farm and in Atlanta, giving a dose twice

a week. I sent to the farm an Irish cow-doctor, who had some reputation in Atlanta, with a collection of medicines which he said were used in the "ould" country, promising him \$10.00 a head for every cow he saved. He used drenches and injections extensively, but all the cows under his treatment died. On his return I asked him why he was unable to save them. He replied, "They are different from the cows of the 'ould' country, they died too 'quack' for me;" meaning that the disease was more virulent than he had seen it in Ireland—the animals dying generally in from twenty-four to forty-eight hours after they were taken. I lost all of my Durhams, part of my Ayrshires and about twenty-five head of Devons, including the six imported from England. Three of the latter died in Atlanta and three at the farm, five within the same week, though separated from each other at a distance of eighty miles, north and south—those in Atlanta in the shade on dry food, and those at the farm on pasture.

The disease re-appeared at the farm the next season, but in a milder form. On its re-appearance the entire herd were drenched twice a week with salts and spirits of turpentine. I lost but few cases the second year, and from that date to the present time the disease has not been on the farm as an epidemic.

During the years 1876 and 1877 I was engaged in large shipments of beef cattle to Edisto Island near Charleston, S. C. Without exception, all the cattle purchased during the summer from the mountains of Georgia became more or less affected with Red-water within ten or fifteen days after their arrival at the Island. About half of them died and the others required six or eight months to recuperate and get fat enough for market.

The Durhams purchased in Middle Tennessee died of Red-water even more rapidly than the Georgia mountain cattle, while those purchased in Middle Georgia were sel-

dom affected, and those from Florida appeared to be exempt from the disease.

During the war, at the time of the invasion of Kentucky by the Confederate forces, a large number of Durham cattle were purchased and sent South for the use of the army. Several herds were pastured on my farm during July and August. I noticed one herd of over 200 head in charge of a herdsman with whom I was acquainted. The cattle were all driven to the banks of the Etowah river, where they remained until after the battle of Chickamauga. On my visit to the battle-field I saw the remnant of the herd of 200 head referred to. It consisted of a small Georgia bull yearling and one Durham heifer. The man in charge told me they had all died of "murrain" between the Etowah river and Ringgold. I saw in a lot in which the drove had remained two or three days ten or fifteen of the dead cattle.

"Cattle should not be moved in the cotton States between the months of March and October, unless they are under six or eight months of age.

"In July of this year (1880) a gentleman from Tampa, Fla., visited Kentucky and purchased a lot of very handsome Durhams, old and young, together with some very fine Cotswold sheep. I cautioned him as he passed through Atlanta to keep them out of the sun. I heard from him a few days since (September 3rd) and he had lost all of his Durhams except the calves, and the Cotswold sheep were doing badly and would, he thought, die before winter. The lot must have cost him not less than \$1,500.00.

"My experience has taught me that the Durhams are more liable to this disease than any other breed, probably on account of their size and plethoric habits, the Devons next, then the Ayrshires. The Channel Island cattle seem to be about equally with the natives subject to Red-water.

The great secret in doctoring cattle affected by Red-water is in taking the disease in its incipency. A herd of improved cattle should be closely watched when there is danger of the disease in the neighborhood, or where any have been recently brought from abroad. It occurs generally between the middle of June and the last of September. The first symptoms in milch cows is immediate cessation of milk secretion. In twelve hours the cows will be entirely dry. With others than cows in milk, the first symptoms are refusal to eat, standing apart from the rest of the herd, and, when driven, lagging behind. If offered fresh water they will usually urinate and then the color of the water can be observed. Every animal attacked should be immediately drenched to bring about an action of the bowels, using $1\frac{1}{2}$ lbs. of Epsom salts for a grown animal and a pint of castor oil in extreme cases, adding two or three drops of croton oil. The doses should be repeated every six hours until the object is accomplished. Drenches of flax-seed tea should also be given in quart doses. Mr. J. B. Wade, of DeKalb county has been very successful in the use of quart doses of melted lard with flax-seed tea. As soon as the animal is relieved it usually recuperates rapidly and is liable to a second attack only in exceptional cases."

The evidence derived from the above reports establishes nothing as to the cause of Red-water other than the fact that it usually accompanies acclimation. It discredits the hitherto general belief on the part of veterinarians that low, rank pastures produce it. The necessity of prompt purging is clearly shown by the experience of all the gentlemen whose herds have been affected.

HOOVE.

This disease is caused by the fermentation of green vegetable food in the rumen of cattle. It usually occurs when cattle are taken from a poor pasture to one contain-

ing luxuriant vegetation, such as succulent grass, field peas, etc. The hungry animals eat too much and so overload the rumen that it ceases to circulate the food, and a rapid fermentation takes place which generates a volume of gass, which in its effort to escape causes serious uneasiness and often intense suffering in the animal affected.

Youatt mentions the following symptoms of Hoove, viz: 'The animal gradually becomes oppressed and distressed. It ceases to eat; it does not ruminate; it scarcely moves, but stands with its head extended, breathing heavily and moaning. The whole belly is blown up; this is particularly evident at the flanks, and most of all at the left flank, under which the posterior division of the rumen lies. The rumen in cattle is scantily supplied with either blood-vessels or nerves, and therefore the brain is seldom much affected in an early stage of Hoove. Swelling, unwillingness to move, and laborious breathing, are the first and distinguishing symptoms.' In proportion as the rumen is distended by the gas the possibility of its escape is lessened, and the difficulty of administering medicine increased since the entrance to the rumen is closed by the distention of the latter. The unnatural size of the stomach causes it to press upon other vital organs, producing labored breathing, interrupting the circulation of the blood and finally causing inflammation which extends to the brain. Unless speedily relieved death must ensue. In simple cases the gas may be extricated by causing the animal to move rapidly, and by the concussion occasioned by the jolting of the contents of the stomach, open the entrance to the rumen and allow the escape of the accumulated gas. Alkalies or oils are also efficacious in the early stages of the disease, before the entrance to the rumen has been close against their admission by too great distension. In severe cases, either the probang, stomach pump, knife or trochar, must be used.

The probang, which consists of a flexible tube termi-

nated by a rounded and perforated solid, may be passed down the throat of the animal and the rounded extremity forced through the œsophagean canal by means of a stilet within the tube, the stilet withdrawn and the gas allowed to pass out. As soon as the belly falls, and but little gas escapes, the tube should be withdrawn. If the animal swells again, the probang may be re-introduced. This necessity may often arise as the probang simply removes the gas already generated and does not remove the cause. The tube should not remain in the gullet long at a time. The stomach-pump is superior to the probang, since by its use the gas may not only be removed, but medicines injected to remove the producing cause of the disease.

While the knife inserted into the rumen above the flank effectually removes the gas there is danger of portions of the contents of the rumen falling into the cavity of the abdomen and proving a source of irritation, inflammation and finally of death. To prevent this, the trochar, which consists of a stilet encased in a triangular silver tube, is substituted for the knife, the stilet is withdrawn from the wound, leaving the silver tube in the wound. This penetrates several inches into the rumen and out through the skin and effectually prevents the escape of the contents of the rumen into the cavity of the abdomen, while it allows the free and continuous escape of the gas.

Youatt describes the point at which the knife or trochar should be inserted as follows: "Suppose a line be drawn close along the vertebræ, from the haunch-bone to the last rib, and two other lines of equal length to extend down the flank, so as to form an equilateral triangle; the apex of the triangle, or the point where these lines meet, would be the proper place for the operation, for there is no danger of wounding either the spleen or the kidney." After the animal is relieved the following treatment is suggested by Mr. Youatt: "A pound of epsom salts should be administered with an ounce of carraway powder,

and half an ounce of ginger; and on several successive mornings, four ounces of Epsom salts, two of powdered gentian, and half an ounce of ginger should be given," to restore as speedily as possible healthy action of the rumen.

If an animal is gorged with grain, soda and Epsom salts should be promptly administered.

PUERPERAL FEVER.

This disease may generally be prevented by proper attention to the cows just before, during and immediately after calving.

Before calving, and as maturity approaches, if the cow or heifer is not on grass, she should have laxative diet, such as bran mash, but no heating food, such as corn meal, cotton seed meal, etc. If her condition is already very high, she should be kept on lean pasture for some weeks before calving. It is generally cows in high condition and deep milkers that are affected with milk fever.

The udder should be carefully watched for some days before the time for calving when there is a rapid secretion of milk taking place, and prompt measures adopted to prevent hardening or caking of the udder. If the milk will flow, a portion of it should be drawn each day to relieve the distention and prevent inflammation. If, as is sometimes the case, the milk cannot be drawn, the udder and teats should be thoroughly rubbed with arnica and hog's lard, mixed in equal quantities, using the hand for rubbing, as the warmth of the hand will assist the absorption of the ointment. If these precautions are used, the cow carefully fed on warm, laxative mashes for several days after calving, and kept from cold rains and winds, cases of puerperal fever will be very rare. If, however, a case does occur, prompt attention is demanded. It usually occurs the second or third day after calving, when there is a rapid determination of blood to the udder to supply the milk secretions. If such secretion is then interrupted by cold

or an inflamed condition of the udder, the whole system becomes deranged, and what is known as puerperal or milk fever ensues. Allen gives the following

Symptoms—"The disease is first perceived by the animal refraining from food, and looking dull and heavy. A cold, shivering fit comes on, accompanied with so much debility that the beast commonly drops, and is unable to rise until she obtains some relief from medicine. The animal becomes very restless, and appears to experience great pain in the body, as she often looks towards the flanks and kicks with her feet, and seems very much distressed. The head, as the disease proceeds, is in general so severely affected, that the cow loses her senses, and will knock and bruise her head against anything, and do herself much injury, if great care is not taken. The pulse is quick, being about 70 in a minute, and the tongue parching dry. The bowels are costive, and there is no secretion of milk. . . . As the disease advances, the belly becomes enlarged; if purging medicines lessen the swelling in the body it is a good sign; but if they are made use of, and the belly still increases in size, there are little hopes of her recovery.

"A purging drink should always be administered as early as possible. The following is highly recommended by some practitioners :

Nitre	2 ounces
Ginger, powdered	1 ounce
Epsom salts	1 pound
Anise seed, powdered	1 ounce
Treacle	4 ounces

"Pour three pints of boiling water upon the ingredients, and let them be given when new milk warm."

Epsom salts alone or lard will answer if the other ingredients are not at hand—dose, one pound to one and one-half pounds of the salts, or one quart of melted lard, to be repeated in half these quantities, if no action is se-

cured in eight or ten hours. If the medicine does not act freely, clysters may be used to advantage. As soon as the bowels are opened and the fever reduced, an effort should be made to restore the tone of the system. The following is recommended by Allen in his work on "American Cattle:"

Salt of tartar	$\frac{1}{2}$ ounce.
Oil of turpentine	1 ounce.
Ginger, powdered	$\frac{1}{2}$ ounce.
Flour of mustard	2 ounces.
Grains of Paradise, powdered	$\frac{1}{2}$ ounce.
Treacle	4 tablespoonfuls.
Caraway seed, powdered	2 ounces.
Anise seed, powdered	2 ounces.

Mixed and given in a quart of warm gruel, to which may be added a wine-glass of gin or brandy.

"This drink will tend to invigorate the system and promote the secretion of milk. It may be repeated once a day, or every other day, for three or four times. Should the bowels be inclined to be bound any time during the complaint, recourse to a purging drink should be had immediately. Cows afflicted with the milk fever should be taken great care of, and be well nursed. It is requisite that the stall where they lie should be well littered; and it is frequently necessary that, when they are cold and shivering, they should be covered with a blanket or some other warm clothing. To assist in subduing the inflammation of the udder, it should be rubbed two or three times a day, about half an hour each time, with soft soap, or pipe-clay and cold spring-water.

"To solicit the flow of milk, the paps should be drawn occasionally; it is a good sign when the milk begins to be secreted. As they are frequently unable to take a sufficient quantity to support themselves, it becomes necessary to horn some nutritious food into them. Good gruel is well adapted for this purpose, and two or three quarts should be given three or four times a day. Linseed por-

ridge, sweetened with treacle, is also proper to be given at this time. The beast must be constantly attended to when the head is much affected, otherwise she may do herself some serious injury." Water-cure has been satisfactorily used in this and all other inflammatory diseases of cattle.

CHOKING!

Cows are liable to be choked by attempting to swallow ears of corn, potatoes, etc. When this occurs, resort must be had to the probang to force the obstruction forward into the stomach. If a regular probang is not at hand, a temporary one may be constructed of a piece of grape-vine or rattan, about five feet in length, wrapped at the ends with thread, and covered with a disc of soft leather. This, well greased, may answer as a substitute for a probang in cases of emergency.

GARGET, OR SWELLING OF THE UDDER.

This disease, like puerperal fever, is generally the result either of neglect or bad management. It usually attacks deep milkers or heifers with the first calf. Cows in high condition are more subject to this disorder than those in a lean or moderately good condition. If the bag fills to such an extent before calving as to risk inflammation, a portion of the milk should be drawn daily to relieve the distension. If this is not done, the milk, remaining in the udder so long, will coagulate and produce inflammation in a portion or all of the udder, and caking of the udder results. If such symptoms are observed after the birth of the calf, it should be induced to suck the teat of the affected part before too great inflammation and hardening occurs. If not relieved in its early stages, the udder should be thoroughly rubbed several times daily with melted lard and arnica mixed in equal quantities. This well rubbed in with the hand will generally give relief. If much fever

prevails in the udder, an India-rubber sack, large enough to cover the udder, should be tied over it, and kept filled with soft water of about 60° or 65° F. The water should be frequently renewed.

WOUNDS, SPRAINS AND BRUISES

Are best treated with cold water, keeping the injured parts bound with cloths, which are kept saturated with cold water. This keeps down local fever, and allows a healthy action in the parts affected, thus insuring speedy recovery. Even refractory animals soon become manageable under this treatment, so great is the relief afforded.

LOSS OF CUD

Is not a disease but a symptom or consequence of disease. It results from either debility or some inflammatory disease. The remedy should be applied to the disease of which the "loss of cud" is the symptom. The character of the cause must first be determined by a careful examination of the animal before attempting a remedy. It generally results from some derangement of the digestive organs.

LICE AND TICKS.

Cattle in low condition are often seriously injured by these parasites—by the former in winter and spring, the latter in early summer. Lard and Scotch snuff, or Cayenne pepper well rubbed over the hide, will destroy them. Lard or oil of any kind used alone will also prove effectual. Mercurial ointments and sulphur should not be used on account of their danger to the animals themselves. Kerosene oil rubbed on the hides of the affected animals will prove effectual for the removal of either lice or ticks.

ABORTION

Has never been troublesome in Southern herds though quite troublesome in some localities at the North. As a cow that has once aborted is likely to repeat the accident,

she should be either fattened for the butcher or removed from the rest of the herd, to avoid all sympathetic influence on others.

"HORN AIL" OR "HOLLOW HORN"

Is a symptom of some derangement of the system, and not a disease. Boring the horn and pouring into it all sorts of villainous compounds only increase the suffering of the animal without striking at the cause of the trouble.

POISONING.

Cattle are sometimes poisoned in early spring by eating plants, such as ivy and wild parsnip, water hemlock, etc. The symptoms "are principally sudden swelling, with a peculiar stupor, in the early stages of the attack; cessation of rumination; a change in the quality of the milk, which becomes thin and serous, and presently ceases to be secreted; the refusal of all the solid food and eagerness after water; quickening of the pulse, which yet becomes small, and, in some cases, scarcely to be felt; and the animal frequently grinds the teeth, and paws, and rolls as if it felt severe colic pains. In a few instances the stupor passes over and a degree of excitement and blind fury succeeds, which has been mistaken for madness—*Youatt*." These vegetable poisons cannot be neutralized by medicines; the only remedies are to be found in the use of the stomach-pump and active purgatives. Give a quart of melted lard or one and half pounds of Epsom salts, and repeat the doses if no action is had in from four to six hours. With the pump repeatedly inject and withdraw warm water, and finally fill the rumen with warm water. If poisoned by the use of corrosive sublimate give the whites of several eggs beaten with thick gruel, repeating it every hour.

CHAPTER VI.

GRASSES AND OTHER FORAGE PLANTS ADAPTED TO
GEORGIA.

As success in rearing cattle depends upon the abundance and quality of food suited to their consumption, available to the breeder, "A Manual on Cattle" would not be complete unless it conveyed some information as to the most economical and profitable means of supplying the food necessary for securing the best results in rearing them. Since cattle-breeding has hitherto received but little attention in Georgia, but little thought has been given to the production of forage, more than to supply food for horses and mules used in the cultivation of the farms. In the larger part of the State, neither summer pasturage nor winter forage is supplied artificially, except to work oxen and milch cows.

Now that the stock of cattle in the State is being rapidly improved by the introduction of thoroughbreds which are either bred pure or used to "grade up" the "natives," the farmers of the State, recognizing the fact that to secure and maintain improvement, good pastures or abundant forage for soil-feeding are necessary, are turning their attention, more than ever before, to the subject of forage production.

The object of this chapter, therefore, will be to supply, to those who desire to improve their stock, the needed information in a concise and condensed form. A general discussion of forage plants will not be undertaken, but the attention of the reader will be invited to a practical discussion of those plants which may be profitably cultivated within the borders of this State. Technical names will be avoided as far as practicable.

The grasses which have been and may be profitably cultivated in Georgia are orchard grass, herds grass or red top, tall meadow oat grass, Italian rye grass, blue grass, timothy, Bermuda grass, crab grass and wild rye or Terrell grass. To these may be added (since they are true grasses) rye, barley, oats, Indian corn, and the millets.

Among the leguminous or pod-bearing plants may be mentioned red clover, white clover, lucerne, spotted medick, common vetch and the cow-pea.

ORCHARD GRASS,

Is the most reliable of the cultivated grasses for Middle and North Georgia. It affords abundant pasturage in the late fall and early spring; or, if not grazed during the fall, affords good pasturage during the winter months. It grows in tussocks, and hence is not suited for lawns, where a smooth, even surface is desired. In order to secure a "full stand" very heavy seeding is necessary. The seed is light and chaffy, and hence not less than two bushels should be sown to the acre. The best results are obtained by sowing on well-prepared land in September. Like most other grasses, it succeeds best on stiff lands, failing on those below the grade of sandy loam. Orchard grass is valued more for grazing than as a hay grass. If, however, it is cut when in bloom, it makes very good hay—if not cut till the seed are formed it becomes woody and almost valueless for hay.

Unless saving pure seed is the object it should never be sown alone, but mixed with other grasses, as hereafter directed.

When cut for seed the stems above the undermath should be cut, and then the balance, which will embrace the bulk of the crop, may be cut and cured for hay.

Orchard grass grows very well on land partially shaded by trees. Many of our woodlands may be converted into valuable pastures by cutting out the undergrowth, thinning

the larger trees, preparing the land and sowing orchard grass. Orchard grass, being perennial, affords many successive crops from one seeding if not overrun by weeds and other grasses, and annually top-dressed to compensate for the removal of annual crops in hay or pasturage.

TALL MEADOW OAT GRASS.

This is a valuable grass, very similar in its habits of growth to orchard grass, more valuable for hay, will grow better on sandy lands, but requires greater fertility. It ripens very nearly with the orchard grass, and has the peculiarity of ripening seed while the straw is yet green. In consequence of this habit the undermath makes excellent hay after the seed are saved. In many respects this is superior to orchard grass, but requires richer soil. Just here it is proper to remark that no grass need be expected to succeed well on very poor soil. The meadow oat grass is perennial, and hence, other things being equal, more valuable than annual grasses.

It should be sown in August or September, at the rate of two bushels per acre.

Neither orchard nor meadow oat grass should be pastured during the summer, their chief value consisting in the winter pasturage which they afford. Ripening at the same time, they may be sown together, to give variety to the hay as well as to the pasturage. If sown together one bushel of each should be used.

BLUE GRASS

Is more valuable in Georgia as a lawn grass than for stock. In the northern part of the State, however, especially on lands abounding in lime, either naturally or artificially supplied, blue grass will afford a valuable addition to permanent pastures, on which, however, if heavily grazed, it will eventually root out other grasses.

Since it is stoloniferous, spreading from the root under-

ground, the trampling of stock and close grazing seem to facilitate its spreading and enable it the better to resist our climate. It is not valued as a hay-producer, but, like orchard and meadow oat grass, affords superior winter pasturage if not grazed in the fall. Stock are perhaps more fond of it than of any other perennial grass except Bermuda. It will not live through our summers on sandy soils unless partially shaded and supplied with an abundance of moisture.

When sown with other grasses it is scarcely perceptible until the second year. If sown alone, on rich and well-prepared soil, free from weed and grass seed, it makes a sod the first year.

HERDS GRASS, OR RED-TOP,

Is particularly adapted to moist soils, and will grow even on pipe-clay land, where nothing else useful will grow. It is perennial, makes good hay and affords very good pasturage in early spring. It grows on uplands, but succeeds best on lands too moist for orchard or meadow oat grass, it should be sown in September on bottom lands. It ripens later than orchard and meadow oat grass, but is sufficiently advanced when they are in condition to cut to make good hay, and hence may, to some extent, be mixed with them. It does better, however, mixed with

TIMOTHY,

which gives satisfactory results only on drained bottom land. This is recommended only for hay, for which it is admirably adapted. It makes very little aftermath, and hence affords poor fall grazing. Having tuberous roots, it is injured by grazing. It will succeed only in the northern part of the State, in mountain coves, and on creek and river bottoms. It will not answer for general cultivation in the State.

GUINEA GRASS

Has been cultivated successfully by some farmers for hay. Its root is perennial, but the top is killed by the first severe frost. It has a fleshy cane root, which propagates rapidly under ground under favorable circumstances, and which is exterminated with great difficulty—the principal objection to the plant.

It should be sown only on land intended to be permanently devoted to grass, on account of the difficulty of exterminating it when once well set. On rich land it affords several cuttings of hay of medium quality.

It should be cut when about three feet high and before it blooms. If left standing as long as is usual with other grasses it becomes too hard and woody to make good hay.

BERMUDA GRASS

Is the only perennial grass which can be relied upon for summer pasturage. Those already mentioned are peculiarly adapted to furnishing winter pasturage, but to do this they must *not be grazed in summer*.

The Bermuda affords summer pasturage unsurpassed in richness and reliability, and none is more relished by stock of every description. It affords an impenetrable sod, which completely protects the soil from washing and injury by the trampling of stock, while, in common with other perennial grasses, it makes annual contributions of humus to the soil and gradually improves its fertility. It can be relied upon to produce hay only on bottom land, or on land supplied with moisture throughout the summer. On such lands it yields an immense quantity of hay of very superior quality. On uplands it does not attain sufficient height to be cut for hay.

Bermuda grass propagates by root under ground and by surface runners, which take root at every joint. It bears no seed, and hence is easily confined within any desired limits,

if reasonable precaution is used by the proprietor of the lands to prevent scattering the root by means of the plow, washing rains or creeks.

It can be readily and rapidly propagated by burying portions of the root as follows: Prepare the soil as for corn, lay off rows three feet apart with a small plow, which will not render the surface of the soil very uneven, drop pieces of the root a few inches long every two feet in the drill, cover with the foot and *tread on it* to bring the earth in closer contact with the root and thus facilitate its growth. This should be done in early spring—say at the time of planting corn. The runners will rapidly spread over the space between the rows, taking root as they advance, so that on good land there will be a good sod by the second year. The land should be rolled after planting.

Bermuda is eminently the summer grass of the South, and will prove a blessing to Southern agriculture when the prejudices which now prevail against it shall have been overcome and it shall take the place in our system which it is, beyond question, destined to fill.

SPOTTED MEDICK,

Sometimes called burr clover, though it is not, strictly speaking, a clover at all, sown on Bermuda sod, grows while the Bermuda is dormant, and affords winter and spring pasturage, thus supplementing the Bermuda and affording perennial pasturage. It gets its name from the form of its seed pods, which resemble small burs. These burrs are formed by the spiral coil of the seed-pod.

The seed should be sown in August or September, on and prepared for their reception, if intended to be grown alone or on Bermuda sod, early in August. Those who have grown medick on Bermuda sod have been highly pleased with the results.

VETCH.

There is a variety of winter-growing vetch which grows during winter and spring on Bermuda sod, as does the spotted medick. They both have slender stems, which trail upon the ground if not supported by other vegetation, both make a quantity of seed, and both spring up spontaneously year after year where the seed matures and falls. The pods of the vetch turn black as they mature, and as soon as ripe burst and scatter the seed. It is hence very difficult to save the seed of this plant.

The burrs of the medick fall upon the ground when the plant matures, early in June, and may be raked up in quantities. This burr is troublesome on account of adhering to the wool of sheep when they lie upon the ground where it has fallen.

Both of these plants are annuals, but have the merit of propagating themselves spontaneously after they have been once started. They do not interfere with cultivated crops, and are easily exterminated. Their principal value arises from the facts that they grow on the Bermuda sod during winter and spring, and re-seed themselves.

ITALIAN RYE GRASS,

Affords excellent winter pasturage, but, being an annual, will not be cultivated so long as we have such perennials as orchard and meadow oat grass.

CRAB GRASS,

Next to the Bermuda, is our best reliance for summer pasturage and produces a large quantity of hay when harvested at the proper stage of maturity—when in bloom. Heavy crops of hay may be made on good land by preparing thoroughly in May, killing all growth then on the soil and allowing the crab-grass to take entire possession. There is generally seed enough already on soil that was

cultivated the year before, to secure a full stand. Stock of all kinds are very fond of well-cured crab-grass hay. If seasons are favorable fine crops of this hay may often be saved from land from which small grain has been harvested. The principal value of crab-grass, however, arises from the summer pasturage it affords, being a spontaneous growth and costing nothing. The hay from this grass is difficult to cure and analysis shows it to be little superior to oatstraw.

OTHER GRASSES.

Besides the foregoing, which are generally recognized as grasses, there are other true grasses which are usually cultivated for their seed and hence are ordinarily classed in accordance with the use made of them, but which are, nevertheless, valuable for the purposes for which the foregoing are commonly cultivated. Among these are rye, barley, oats, Indian corn and the millets.

BARLEY

Has been sown on Southern plantations for winter grazing on a small scale for more than half a century and is esteemed highly for that purpose by all who have used it. It should be sown on very rich soil in August at the rate of not less than three bushels per acre—more will be better. Thus sown it affords good pasturage from the time the summer grasses begin to fail until Spring. A more economical method of using it, however, is by cutting it daily and feeding it on the soiling plan to the stock. Fed in this way a given area will supply four times as many stock as can be pastured upon it, besides avoiding injury to the land by trampling while wet.

Besides, there are very few days during our winters in which the barley may not be cut and fed to the stock, while there are sometimes weeks at a time when the soil

is not in a suitable condition for pasturing. There is no waste in cutting, while much of the barley is either pulled up, soiled by the excrement of the animals, or destroyed by their hoofs in grazing. It is but little more trouble to cut and feed the barley than to turn the stock to and from the pasture.

RYE

May be treated in the same way as barley, and does not require such fertile soil to make a profitable crop. The two may be mixed to give variety, and sown if intended for soiling, in drills a foot or fifteen inches apart, at the rate of two bushels of barley and one of rye to the acre. Sown thick, the stalks are forced to grow up straight, and consequently cutting may be commenced as early in the fall as it is needed. If intended for grazing, the same quantity may be sown broadcast.

No other grass or combination of grasses will supply so much green food of such good quality as barley and rye mixed. Where orchard grass and meadow oat grass will grow, however, every farm should have a liberal area devoted to them.

With the facilities offered by the soil and climate of Georgia for supplying green food throughout the winter, it is surprising that more attention has not been given to winter dairying. As before remarked, there is no excuse for white, or otherwise inferior butter anywhere in Georgia, at any season of the year. If the people of Georgia will fully avail themselves of their natural advantages of soil and climate, no prophetic vision is necessary to discover happiness and prosperity in the near future.

OATS

While not especially adapted to winter pasturage may be made, to an important extent, supplementary to

other more valuable winter grasses; but whether cut when in bloom to make hay, or allowed to ripen for the grain, furnish perhaps the cheapest forage crop for the middle and southern parts of the State.

INDIAN CORN

Sown broadcast on very fertile soil or planted very thick in drills at the rate of from four to six bushels per acre will yield, perhaps, more forage per acre than any other plant adapted to the South, the only obstacle to its culture lying in the difficulty of properly curing the forage when cut green. It should, like other grasses saved for hay, be cut when in full bloom. It is excellent whether cut for soiling purposes or cured for winter forage. If cut the first time before the joints are formed it will put out and make a fine second crop. The blades which are harvested at the first cutting would, if not so harvested, be of little value if allowed to remain, as is usually done, until the plant blooms, as they usually die from the influence of the shade before the crop is gathered.

GERMAN MILLET.

If sown very thickly on fertile soil so as to reduce the size of the stalks, and cut when in bloom before the stems have become hard and woody, makes a large quantity of hay of rather inferior quality. Being of very rapid growth it is an exhausting crop, and hence has not met with very great favor with the farmers of Georgia.

HUNGARIAN MILLET

Being smaller in growth than the German, and making in as short time, answers the purpose of an annual hay plant better than the latter, and makes in consequence of the smaller stem a better quality of hay. Neither, however, has met with much favor with those who have tried them.

CAT TAIL MILLET,

Recently named by Peter Henderson, "Pearl Millet," has been planted for half a century in small patches for the purpose of feeding green to mules and milch cows, during the summer. It is very valuable for this purpose, affording repeated cuttings of succulent food, which is relished by stock moderately well, but not so much as green corn, clover or lucerne. It should be sown in drills, on fertile soil, and cultivated. It supplies an immense amount of green forage, in good seasons, may be cut half a dozen times, and supplements pastures in dry weather better than any other plant, because of the repeated cuttings that can be made from it during the summer. It should be cut before it joints, to ensure a prompt renewal of the growth. The principal value of this plant is for soiling purposes. While it may be saved for winter feeding it cures with difficulty, and makes rather inferior forage. The only circumstances under which it should be cured for hay are when the supply is greater than the immediate demand. In good seasons when other forage is abundant, and the growth of the millet very rapid, this will sometimes happen, as it is necessary to keep it cut down before it joints, if repeated succulent crops are expected. Whether needed, therefore, for immediate use or not, the whole patch, except that reserved for seed, should be cut over every few weeks, to keep up a succession of succulent crops. The plant is very small and tender when it first germinates, and hence the seed should not be planted until the soil is warm, in spring—about the time of planting cotton.

LEGUMINOUS PLANTS—RED CLOVER.

The cultivation of red clover need not be attempted in Georgia, except on soils containing a large per cent. of clay, and those of a fair degree of fertility. It is very justly highly prized in climates better adapted to its

growth than ours as a soil improver, but in Georgia does not compare with the field pea (bean), for this purpose. In our climate, red clover may be sown in September or March, if sown alone or with grass seed, but if sown with small grain it should be sown in September. Even if sown alone September is the better time, that it may acquire sufficient root to withstand our mild winter, but more especially that it may acquire sufficient root by summer to pass uninjured through the droughts, which usually occur in July or August. In the Northern and Middle States, clover seed are generally sown in early spring, to avoid being winter killed; here we must guard more against summer killing, and hence sow in the fall for the reasons stated above. The soil should be thoroughly prepared before sowing the seed, which should not be covered exceeding half an inch in depth. If sown just before a rain on freshly prepared soil they need not be covered at all. Where sown with small grain the return for the labor of preparing the soil, and the fertilizers used, is in the crop of small grain harvested, no hay crop is gathered till the second. If sown alone, two crops of hay are gathered the first year, which will usually equal the value of the small grain crop gathered, when sown together. The objection to sowing with small grain in our climate is that the clover is dwarfed by the occupancy of the soil by the grain, until the latter is harvested, when the tender plants are suddenly exposed to the heat of the sun, to which, if drought ensues, they usually succumb. All experience in Georgia is in favor of sowing clover and the grasses without small grain, as the surest means of securing a stand.

Red clover, however, should never be sown alone, unless seed are to be saved from the aftermath, and even if this is expected, the grasses will not materially interfere with it, since they will not mature seed in the aftermath.

Orchard grass and meadow oat grass mature with red clover, and hence are ready for the hay harvest at the same time. One or both of these grasses should be mixed with clover—they interfere with each other very little, require to a large extent different elements of plant food, and present a variety of diet to the stock in the hay.

The second crop of clover, which salivates horses, has no such injurious effect upon cattle either in its green state or when cured as hay.

Red clover is a biennial plant, but re-seeds itself very well in our climate. The seed will lie in the ground many years and then germinate, when brought sufficiently near the surface.

If sown alone, twelve pounds of pure seed will give a good stand on an acre. This is more than is usually sown, but the additional cost is well repaid in the greater certainty of securing a stand.

WHITE CLOVER

Is never sown alone, but when mixed with the grasses, such as orchard, meadow oat grass, herds grass, or timothy, it makes a valuable undermath, though being perennial, like blue grass, it is disposed to crowd out its neighbors. It does not grow tall enough to be valuable for hay when planted alone, but in connection with red clover and the grasses adds much to the pasturage.

LUCERNE

Is exceedingly valuable, either for hay or for green soiling, on account of the early and repeated cuttings it affords, and for its superior nutritious qualities. It should never be grazed for the reason that the continued close biting of stock destroys the plants. It should be sown alone in drills sufficiently wide to admit the plow—fifteen or eighteen inches apart. Lucerne is very tender when young, and is easily overrun by weeds and grass. It is

hence important to have the soil to be planted as free as possible of the seeds of weeds and grass, and very thoroughly prepared by repeated plowing and harrowing.

It should be planted early in September, after the summer weeds and grasses have ceased to germinate, and yet early enough for the lucerne to take good hold on the ground before winter. If planted thus early on fertile soil, it will be sufficiently advanced before ordinary spring vegetation starts to admit of thorough working. This working is necessary to protect it from being overgrown by wild vegetation, and hence all attempts at broadcast sowing have proved failures. It needs annual cultivation and manuring, but amply repays, by its large yield of most nutritious green food or hay, those who will give it the attention necessary to success in its cultivation. It needs to be cut, whether to be fed green or cured for hay, when the first blooms appear. If left till in full bloom, the stems become hard and woody. It may be cut as often as six times in very favorable seasons, and seldom less than three times in the most unfavorable seasons.

After a stand is once secured, if properly cultivated and manured, it will afford a number of cuttings annually for more than a quarter of a century. It sends its tap-root so deeply into the soil that it is affected less by drouth than most of our cultivated plants. It has been known to descend eight feet vertically into the sub-soil. Satisfactory results in the cultivation of lucerne may not be expected on poor or poorly prepared soil. It will succeed well in any part of Georgia with proper preparation of the soil, and annual manuring and cultivation. Every farm should have a few acres of it.

MIXED GRASSES AND LEGUMES.

As before remarked, unless saving pure seed is the object of cultivation, none of the grasses or legumes, except lucerne, should be sown alone either for pasture or for

hay. Stock of all kinds prefer a variety of food, and will consume more and thrive better if supplied with a variety than if fed on a single article, however nutritious.

For pasturage or hay, the following mixture is recommended on uplands :

Orchard grass	per acre,	.	.	.	.	.	1 bushel
Tall Meadow oat grass	"	.	.	.	.	.	1 "
Red Clover	"	.	.	.	.	.	8 lbs.
White Clover	"	.	.	.	.	.	3 "

If the meadow oat grass-seed cannot be obtained, sow two bushels of orchard grass.

If a permanent pasture or lawn is desired, sow in addition to the above, one bushel of blue-grass seed.

On bottom lands sow of

Herd's grass, per acre,	.	.	.	.	.	.	$\frac{1}{2}$ bushel
Timothy	.	.	.	.	.	.	12 lbs.
White Clover	.	.	.	.	.	.	3 "

If practicable, sow all the grasses and legumes in September without small grain.

Neither the grasses nor legumes should be grazed the spring after they are sown. Cut for hay once the first year and allow the aftermath to grow till late fall, when stock may be turned on. Neither should the cultivated grasses or legumes be grazed closely, no matter of how long standing, during our summer months—their roots need protection from our summer sun.

The Bermuda and crab grass are pre-eminently our summer pasture grasses. The cultivated grasses and clovers afford pasturage during the late fall, winter and early spring, and supplement Bermuda and crab grass. Add to these lucerne and a mixture of rye and barley for winter and spring soiling, the cat-tail millet for summer soiling and forage corn for summer soiling and dry food in winter, and we have a supply of forage for cattle unsurpassed in any country on the globe. All that is needed is for the farmers to turn their attention to these matters to make

winter and summer dairying not only possible, but eminently successful in Georgia. Very few have given the subject the attention its importance would justify. Good butter sells in our markets at from 40 cents to 45 cents; poor butter at from 20 cents to 25 cents.

ENSILAGE.

Within the last few years the experiment of storing green forage in silos, or pits in the ground, has been successfully made in the United States. It has been practiced in Europe for some years but has been successfully introduced into the United States during the last three years. What effect this will have upon Southern husbandry it is impossible to foresee, but it promises to increase our already superior facilities for winter feeding by enabling the farmer to promptly harvest such rough provender as drilled corn and preserve it, by packing it into the silo, and excluding the air from it, for winter use in almost the same condition as when cut. There is nothing to prevent those who farm on a large scale in Georgia from availing themselves of ensilage, but the first cost of the silo will be too great to justify its use by small farmers.

INDEX.

A

Abortion	169
Alderney	23
Analyses of Feeding Stuffs	93-95
Analyses of Hay—Green Fodder	93-94
Analyses of Straw—(half)—Roots—Tubers	94
Analyses of Grains, Fruits—Manufactured Products	95
Angus Polled Cattle	43
Ayrshires	33
Ayrshires—Origin of	34
Ayrshires—Description of	35

B

Barley	178
Barley—For Winter	91-92
Beef, a—How to Judge	143
Beef—Corned	143-149
Beef—Cooking	143
Beef—Baked and Roasted	147
Bermuda Grass	173
Blue Grass	172
Bicorn Cow. (Illustrated)	127
Boiling Fresh Meats	148
Breeds tested.	8-9
Breeds of Cattle	17
Breed, a,	17
Breeds—Best for Georgia	53
Breeding—General Principles of	57
Bruises	169
Bulls—Improved	61
Bulls—Selection of	73-77
Butchering—Mode of	143
Butchering	145
Butter—Yield of Cow Eurotus	27
Butter—Management of	134
Butter Worker. (Illustrated)	140
Butter—Keeping,	142

C

Calves—Attention to	61
Calves—Annual Increase	12
Calves—Management of	73-75
Calves—Rearing by hand	74
Cattle—Fodder for Growing	105
Cattle—Channel Island	23
Cattle—Fodder for Fattening	105
Cattle—Diseases of	150
Chaff etc.—Analyses of	94
Channel Island Cattle	23
Churning	138
Choking	168
Climate—Of Georgia	45-48
Clover—Red	181
Clover—White	183
Common Stock	18
Corned Beef	149
Cows—Price of	10
Cows—Milch—Management of	78
Cows—Period of Gestation	82
Cows—Treatment before Calving	83-85
Cows—Stomach of	89
Cows—Winter Pastures for	91
Cows—Drying off	113
Cows—Feeding While Dry	113
Cows—Soiling	114-116
Cows—Relation to Civilization	78
Crab Grass	177
Cream, What is it?	138
Cross-bred	17
Cross-breeding	63
Cud, Loss of	169
Curveline Cow (Illustrated)	126

D

Devons	18-19
Devons—Origin of	20
Devons—Description of	19
Devons—As Work Oxen.	20
Devons—As Milch Cows.	20
Devons—As Beef Animals	22
Demijohn Cow (Illustrated)	129
Diseases of Cattle.	11-150
Double Selvage Cow (Illustrated)	123

E

Ensilage	186
Escutcheon—What is it	118
Escutcheon—Shape of	119

F

Fodder—Analyses of Green	93-94
Fodder-stuffs, Digestible Ingredients of	101-102
Facts from Questions on Cattle	8
Feeding Stuffs—Nutritive Value of	93-95
Feeding Stuffs—Analyses of	93-95
Feeding Stuffs—Nutritive Ratio	97
Feeding Stuffs—Money Value of	97
Feeding Standards	93-101
Feeding—Daily Rations per 1,000 lbs., live weight	103-106
Flanders Cow (Illustrated)	123
Foods—Nutritive Ingredients of	107
Foods—Rich <i>vs.</i> Poor	108
Foods—How to use Poor	109
Foods—Manurial value of	111-112
Full Bloods.	17

G

Galloways	43
Garget	168
Garget—Treatment of	85
Gestation, Period of	82
Georgia, Adaptation to Cattle	45
Grades	17
Grading up Natives	70
Grains, Analyses of	95
Grasses and Forage Plants	171
Grasses mixed with Legumes	184-5
Green Fodder, Analysis of	93
Guenon System	117-121
Guenon System—How to Study it	121
Guernsey	23
Guinea Grass	175

H

Hay—Analyses of	93
Hay—Nutritive Ingredients of	107
Hay—Good and Poor	109
Herds Grass	174
Herefords	37
Herefords—Origin of	37
Heifers, Selection of	73
Heifer Calves, Selection and Management of	81
Heifers, Age to commence breeding	82
High Grades	18
Historical Sketch	13-16
Hollow-horn	170
Holstein or Dutch Cattle	40
Horizontal Escutcheon (Illustrated)	132
Horn-ail	170
Hoove	162-165

I

Introduction	3
Indian Corn	180
In-and-in Breeding	65
Increase in Calves.	12
Italian Rye Grass.	177

J

Jerseys	23
Jerseys—Description of	25-26
Jerseys—Butter yield of	27

K

Keeping Butter	142
--------------------------	-----

L

Left Flanders Cow (Illustrated).	124
Legumes	181
Lice on Cattle	169
Limousine Cow (Illustrated)	181
Loss of Cud	169
Low Grades	18
Lucerne	184

M

Management of Milk and Butter	134
Manufactured Products, Analyses of	95
Meadow Oat Grass	173
Meal, Cotton Seed, Linseed, etc.	110
Medick, Spotted	176
Milch Cows—Management of	78-89
Milch Cows—Proper Feeding of	83
Milch Cows—Winter Fodder for	104
Milch Cows—Selection of	117
Milk, Management of	134
Milk—Bad odors absorbed by	135-139
Milking	86
Millet—German and Hungarian.	180
Millet—Cat tail	181
Mixed Grasses and Legumes	184-5

N

Natives	44
Natives—Grading up	70

O

Oats	179
Oleomargarine	141
Orchard Grass	173
Oxen, Fodder for	104

P

Pampering	68
Pastures, Shade in	113
Pastures—Summer	10
Poisoning	170
Puerperal Fever	165-8

Q

Questions On Cattle	5-8
-------------------------------	-----

R

Rainfall in Georgia	45
Red English Cattle	21
Red-top Grass	174
Red Water in Cattle	150-162
Roots—Analyses of	94
Roots—Nutritive Ingredients of	107
Rye	179
Rye for Winter	91-92

S

Scrub Cattle	18
Selvaige Cow, (Illustrated)	125
Short-horns	27
Short-horns—As Dairy Cows	32
Short-horns—Origin of	28
Short-horns—Characteristics of	29
Short-horns—Description of	31
Solling—Economy of	114-115
Sprains	169
Square Escutcheon, (Illustrated)	130
Steak—How to Broil	145
Stock—Common	18
Straw—Analyses of	94
Straw—Nutritive Ingredients of	107
Summer Pasturage	110

T

Thoroughbred	17
Ticks on Cattle	169
Timothy	174
Tubers—Analyses of	94

V

Vegetation in Georgia	49
Vetch	177

W

Water—Supply of Pure important	112
Winter Feed	10
Wounds	169

INDEX TO ILLUSTRATIONS.

Ayrshire Bull	84
Ayrshire Heifer	85
Bicorn Cow	127
Butter Worker	140
Car-Boy, (Jersey Bull) (back cover).	
Carveline Cow	126
Double Selvage Cow	128
Devon Bull.	18
Devon Heifer.	21
Demijohn Cow	129
Flanders Cow	123
Flanders Cow, (Bastard)	124
Hereford Bull, "Seventy-Six"	38
Hereford Prize Ox	39
Holstein Cow	41
Holstein Bull	42
Horizontal Escutcheon	131
Jersey Heifer—"Lady Baron"	23
Jersey Bull—"Baron of Bellmont"	25
Jersey Cow—"Lucy"	184
Left Flanders Cow	124
Limonsine Cow	131
Selvage Cow	125
Short Horn Heifer	27
Short Horn Bull	31
Square Escutcheon	130

SEPTEMBER CROP REPORT.

Circular No. 31 }
NEW SERIES. }

Consolidation of the Reports of Crops, Etc., FOR THE MONTH OF SEPTEMBER, 1880.

RETURNED TO THE DEPARTMENT OF AGRICULTURE OCT. 1, 1880

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA October 8 1880.

COTTON.

The estimated total yield of cotton in the State, compared to that of last year, is 97, which is small when the increased area devoted to this crop, this year, is considered; and it is apprehended that some of the correspondents misunderstood the question as regards the standard of comparison. In North Georgia it is reported at 96; in Middle Georgia, 99; in Southwest Georgia, 101; in East Georgia, 93; and in Southeast Georgia, 95.

Forty-six per cent. of the crop of the State is reported gathered—33 per cent. in North Georgia, 41 in Middle, 56, in Southwest, Ga., 56, in East Georgia, and 62 in Southeast Georgia.

The condition in which cotton has been gathered, compared with perfect, is for the State, 87, the lowest average being reported in Southwest Georgia—82; and the highest, in Southeast Georgia—96.

The injury by worms, in the entire State, is reported at 2 per cent. The highest reported is 5 per cent., in Southwest and Southeast Georgia.

Fifty-seven correspondents report the seasons unfavorable for picking cotton, and sixty-eight report favorable.

SAVING SEED FOR PLANTING.

The attention of farmers is again called to the importance of saving the best seed for planting. The yield of the next crop will depend, to a considerable extent, upon the care used in saving seed. Seed should be saved from the *best land*, the *best plants*, and the *best bolls*. Again, there was much complaint last spring, of the failure of cotton seed to germinate. Since seed are generally saved from the early pickings, which are often ginned before the seed are sufficiently dry to be safely stored in large bulk, farmers are cautioned against risking their planting seed from early picked and early ginned cotton, in large bulk, unless frequently examined and stirred to guard against the injurious effects of heating.

REPORTS OF EXPERIMENTS.

Those who received samples of different varieties of cotton seed from this Department last spring will please report the results of their experiments and observa-

tions as soon as the facts are ascertained. The object of the distribution of seeds is not only to disseminate useful varieties, but to secure results of experiments with them for the information of the farmers of the State. Blanks for reports of the results of experiments with fertilizers will be forwarded to those to whom samples of commercial fertilizers were sent for test last spring, early in November.

CORN.

The estimated yield of corn in the State is compared with that of last year. In North Georgia it is 103; in Middle Georgia, 86; in East Georgia, 82, and in Southeast Georgia, 95.

Those to whom samples of seed corn were sent last spring are again invited to report to this Department the result of their experiments—whether favorable or unfavorable. It is necessary to accomplish the objects of seed-distribution, to have reports from those who receive the seeds, and it is earnestly hoped that they will be made as promptly as possible.

SUGAR CANE.

The probable total yield of sugar cane is estimated at 95 in the state, compared with last year. The estimate in Southwest Georgia is 95, and in Southeast Georgia 98.

SWEET POTATOES.

The estimated total yield of this crop compared to that of last year is for the State, 108; in North Georgia, 109; in Middle Georgia, 109; in Southwest Georgia, 111; in East Georgia, 100; and in Southeast Georgia, 104. It is gratifying to note the increasing appreciation of this important crop, both as an article of food for man and as a cheap and valuable source of supply of winter stock feed. It is beyond question the root crop for the South. The vines, gathered before frost, make a superior food for milch cows. The attention of the reader is invited to the notes from correspondents on this and other subjects of special interest to the farmers of the State.

CULTIVATING WHEAT.

The Department has distributed 100 bushels of Dallas wheat, which proved under the unfavorable climatic influences of last spring, more hardy than other varieties sown in the State. Those who have received these samples are requested to sow them in drills, where practicable, and cultivate like rice. Recent experiments in cultivating wheat demonstrate its utility in increasing both the quantity and quality of the product.

OATS.

It is gratifying to learn from correspondents of the Department all over the State, that the partial failure in the small grain crop last spring has not discouraged farmers from sowing the usual area in these crops, and that unusual effort is being made to seed a large area in rust-proof oats this fall. Indeed, from the experience of last spring, no one who can secure seed of the rust-proof oats should sow any other variety.

NOTE.—As usual the crop reports will be suspended until the Supplemental Report, questions for which will be sent to correspondents about the 15th of December.

NOTES FROM CORRESPONDENTS.

Under this head correspondents were invited to give their experience on the following, or such other subjects as might occur to them, as might be of general interest:

CHUFAS.—Conclusions reached, after several years experience, of the profitableness of this crop for hogs.

POTATOES.—Experience of the value of the sweet potato for feeding hogs, horses, cows, etc. How does it compare with the turnip in certainty and amount of yield and cost? *Best method of keeping?*

PEA VINES.—Give experience of the value of pea vines for hay, and as a renovating crop. Give actual and comparative results. Is there any increased disposition to sow peas for fertilizing purposes?

COTTON FIBRE.—It is suggested that the following test be instituted and the result reported in this report: Ascertain, by carefully weighing, the relative yield of lint and seed from cotton unmanured, and that manured with different fertilizers, respectively. Have experts to examine the samples of each, and report the comparative quality and value of the staple.

It is not expected that every reporter will write on all or either of the topics suggested. The object is to get *facts* and *actual experience*.

The reports, in the line above suggested, are more full than usual, and many have not been published for want of space; and the comments of the Commissioner have been limited for the same reason.

NORTH GEORGIA.

HART.—Chufas are not yet introduced with us. Potatoes are decidedly better for hog fattening than turnips. The former, when properly cooked and some corn meal mixed with them, start hogs sooner than almost anything. Potatoes are much the surer crop. Pea vines are our best fertilizer, but a poor go to save for forage. Any of the natural grasses, properly looked after, will pay better.

BARTOW.—From our experience of the last two seasons with wheat and sorghum, we judge the growth to be too scanty to be worth the labor and the seed. Worms, rust and rot in cotton. August crop of fruit generally dropped off. July crop never better, but much of that rotten on account of wet weather. An early frost would do great damage to what there is of late bolls.

CHEROKEE.—Chufas are a good food for hogs, and sweet potatoes are excellent. Pea vines for hay and for fertilizing are a very profitable crop.

COBB.—Potatoes have never been fed, to any extent, but enough to prove them to be of great value; and I think they would be a profitable feed for butter dairying. Pea vines are too difficult to cure to become a favorable crop—for profit; millet is far superior. They are not used as a fertilizing crop in this section, though known to be valuable.

DADE.—I bought chufa seed at \$5.00 per bushel, and my experience is that they are not a paying crop in this county. I don't think it will pay to raise sweet potatoes to feed stock. Clover is the hay crop here, and pays better than peas, either for hay or as a fertilizer.

FORSYTH.—Cotton three to four weeks earlier than last season, and three-fourths open, but less than one-third gathered. Some farmers will gather from twelve to fifteen hundred pounds seed cotton per acre.

GWINNETT.—I have 20 acres in peas, sown broadcast 15th June. I broke the land in March with 2-horse plow, cross-plowed with same at time of sowing, and harrowed in the peas. The weather has been very dry, but I think I will get eight or ten bushels per acre. Will sow the land in wheat last of October. I prefer them as a fertilizer to anything of the sort. My neighbors get in the notion to use them in this way every fall, when they see my crop, but fail in the spring because they are too busy.

FLOYD.—Caterpillars made their appearance so late that no material injury has resulted from them. Cotton opened earlier by ten days than last season, and is being sold as rapidly as it can be got to market.

From my limited experience with sweet potatoes as a hog feed I place them first on the list as flesh [fat?] producers. I have no experience in feeding them to horses and cows. The potato is a more certain crop than the turnip, though it costs three times the amount of labor to produce them and it will make two-thirds as much as turnips. Potatoes are worth six times as much as turnips for hog feed. To preserve potatoes: Put them on a bed of cotton seed—about 20 bushels in a pile—smooth the sides up nicely and cover with cotton seed six inches thick. Shelter securely against weather, chickens and dogs.

HABERSHAM.—For thirty years I have grown yam potatoes for fattening hogs and feeding milch cows. I can grow 300 bushel of potatoes at less cost than 600 bushels of turnips. I would not exchange one bushel of potatoes for six bushels of turnips for cows, or ten bushels for hogs. Turnips are an excessively exhausting crop. The ground improves when potatoes are grown and fed upon it. After no crop does wheat and clover do so well (with me) as after potatoes, i. e., a given amount of manure induces the heaviest yield. The potato is the root crop for our sunny land—the turnip for a cooler and moister climate. So says experience.

Pea vine hay is equal to clover, but more time and labor are required to cure it; it is as good or better as a renovator.

ALL.—The cultivation of the pea increases yearly as a preparation for wheat and oats. Sweet potatoes are better for any stock than turnips. They are sure, easily kept, and last longer. Put them up in dry chaff and when cold weather sets in cover securely with dirt, and they will seldom fail to keep.

MURRAY. Next to clover, pea vines yield the best crop for hay, and are regarded as the best renovator in use. They are more extensively sown every year.

WALKER.—Clover is the crop for pasture and hay, and to improve land. I plant my forest land in peas and let my hogs take them in the fall. I find this prepares the land for a set of clover. Once well set in clover I call the land rich and well worth \$20.00 per acre.

MIDDLE GEORGIA.

BIBB.—I consider potatoes the best and cheapest food for stock. Turnips too uncertain a crop—worth but little over half as much as potatoes. The latter keep well in dry sheltered hills or banks of 40 or 50 bushels each—well covered with dry earth as the cold advances.

The pea is to the South what clover is to the North—both as a hay crop and a fertilizer. The only trouble is negligence in curing for hay.

BUTTS.—To keep sweet potatoes: Pile them on a thin layer of shucks, in 50 bushel lots; cover them with shucks and thin dirt, to keep out cold—*all under shelter*. Corn stocks and pine leaves are also good to cover with. Peas turned under while bearing are our cheapest fertilizer.

CAMPBELL.—Hogs still dying with cholera, in this county. Cotton, some twelve days earlier than last year, and two-thirds open.

CARROLL.—J. J. Beverly, of this place, tried chufas last year. He says he kept an account of the cost, and that his meat only cost him three-and-a-half cents a pound. —Chufas not much cultivated here now—not thought profitable. They fatten hogs well, but the land is injured by rooting. Potatoes are the best crop raised here for hogs and cattle. Pea vine hay cannot be surpassed, and, as a renovating crop, there is no superior. Greatly increased disposition to sow for this purpose. For hay: Cut and take them up in an hour, if the sun is shining, or as soon as they are wilted. Build a square rail-pen; put in a layer of vines, run rails or poles through the pen above them; then another layer of vines; and so on, until the pen is too high to get any more up—the higher the better—and cover with a good roof.

DEKALB.—My experience with sweet potatoes, as a food for stock, is very satisfactory. I regard them as being worth about half as much as corn by the bushel, and the most certain of all the crops we raise. It costs no more to grow potatoes than turnips, if the latter be cultivated. For certainty of crops, I would say potatoes three, and turnips one. The best way to keep sweet potatoes, is to convert them into pork, milk and beef, from the first of October to the 15th of November. Undertake to save no more than is required for seed and family purposes, and select those from your late planting. Potatoes that have had two growths almost invariably rot, under any kind of treatment. They are frequently damaged before being dug. When potatoes have been assorted, I have never found any difficulty in keeping them in banks by keeping them dry and protecting them from severe frost.

The best method of keeping potatoes (or which has succeeded best with me), is to wait until they are fully matured before digging, take them up when the ground is dry, place them in banks around a post four or five inches in diameter, to the amount of from fifty to one hundred bushels in a bank, and shelter them. Should the weather turn cold enough to freeze them, take corn stalks and stand them up all around the potatoes, thick enough to prevent the dirt from coming in contact with the potatoes; then throw on dirt to the thickness of from four to six inches; draw out the post, which leaves a hole for ventilation. Should the weather turn very cold, stop the hole with a bunch of hay, or some such thing, taking it out again when the weather turns warmer. When managed this way, I never fail to keep them.

ELBERT.—Sweet potatoes are the most valuable crop I raise, to the area planted—yield more, takes less labor, and less expense to cultivate, and are the most remunerative. They are excellent for milch cows, hogs, etc., to say nothing of their value at the table, used in so many ways; much more nutritious than turnips, do not injure land like turnips, etc.

Pea vines, saved just before frost, are excellent substitutes, and even much better than hay. Stock eat them better, and they thrive faster fed on them.

By turning vines under, just before frost, and sowing plat in wheat, increases the yield from fifty to one hundred per cent, owing to quantity of vines on plat, etc.

McDUFFIE.—Chufas are a very remunerative crop. Superior to peas for hogs. Sweet potatoes are 100 per cent. better than corn, for hogs, horses, etc., taking cost of production of both into consideration. Pea vines make excellent hay if gathered at the right stage. They are the best and cheapest fertilizer used, and many are resorting to it after small grain.

OCONEE.—I think the chufa is greatly overrated. A potato crop on the same area of land is equal to the chufa, and far superior to the turnip.

WALTON.—My experience is that one of the best crops we can raise for hogs is chufas; but they should be turned on them before it is too late in the season, as it injures land for hogs to root them up when very wet and cold.

I raised 1000 pounds of meat last year, on a one-horse farm, and fattened mostly on chufas. It cost me not exceeding four cents per pound. Had I fattened exclusively on corn, it would have cost me double that price. I notice, from observation, that potatoes are very good, not only for hogs but also for cattle and horses. I find pea vine hay an excellent hay for horses or cattle. I cut after the peas are matured, in order to get peas too. But some prefer it when in bloom. The disposition to sow peas as a fertilizer is on the increase.

SOUTHWEST GEORGIA.

BAKER.—After six years experience, I am of the opinion that, on light, sandy lands of Southwest Georgia, the chufa is incomparably the most profitable crop for hogs and poultry that we can raise. I find that one acre of good land planted in them will, after my hogs have had the benefit of the harvest and pea fields, fatten ten head ready for slaughter; and that after the pork hogs have been taken off, ten head of stock hogs will keep in a thrifty condition for two months gleaning the same acre.

The chufa is the only root crop from which I can, (without corn or other process to harden the flesh), kill my hogs and have firm, white meat and lard.

BERRIEN.—Chufas are the best hog crop raised; potatoes good to start on, chufas to finish. To keep, put up dry, after the vines are killed, and keep dry, by shelter, not too hot at start. Peas—more disposition to renovate—less for feed.

Early rust prevented the caterpillar in our county this season. We have received no damage from his depredations. Cotton about all open.

CHATTAHOOCHEE.—We find chufas a profitable crop to plant on waste or spare land. They require but little cultivation, and answer well for hogs.

Sweet potatoes yield more food for man and beast than any feed-crop we plant to the same outlay. To feed stock, three bushels are about equal to one of corn. Very healthy for all stock. To preserve them, exclude all air from them as soon as possible.

CLAY.—Sweet potatoes are very valuable for feeding any stock. They are more certain, and pay much better than turnips.

My father has been raising sweet potatoes for seventy years, and has but little trouble or loss in keeping them. When a frost kills the vines he has them dug and banked, ere they are so long exposed as to "chill." Throw up earth one foot high, in a circle—say eight feet in diameter—cover the inclosed area about six inches with dry pine straw; carefully put the potatoes on the straw, gradually forming a cone, until there are as many potatoes as can lie

in the cone; then, if they are eating potatoes, place slats (extending from the outside of the circle) so as to meet at the apex or top of the bank, put straw six inches thick, on the slats, and cover it ten inches in dirt, leaving a small aperture in the top, over which put a piece of bark or board. If they are seed potatoes omit the slats. In arranging the slats make a door, in order to get potatoes when desired.

The above never fails.

Many thanks for the "Dallas Wheat." I will ever be thankful for seeds, and will be careful to experiment with them.

CLAY.—I know of no crop that compares with the chufa for hogs, but they should always be planted on *clean land*—say sedge. The only trouble is to get a perfect stand. Prepare the land as for cotton; work once with a sweep and hoe, and the crop—on sedge land—is secured.

Potatoes.—All stock are fond of them, but they should be fed in limited quantities to cattle and horses. They are at least two to one better than turnips as a food. There is no need of a failure, as we have five months in which to set the vines. With turnips, the time is shorter, and they are more subject to disasters.

HOUSTON.—I have, for several years past, raised sweet potatoes to fatten my meat hogs, and find them to be an excellent food for hogs, and a great saving to the corn-crib.

LOWNDES.—Too much rain for cotton-picking in August and part of September. Weather fine now.

Chufas.—Good fatterer—yield well on good land. Exhaustive crop.

Potatoes.—Excellent for fattening; especially when mixed with pindars or chufas. Much surer crop than turnips.

Pea Vines.—Increased disposition to raise for fertilizing purposes. Growing disposition on part of farmers to fertilize in every practicable way. My own judgment is that, on exhausted soils, the *beggar-weed* will prove a better reclaimer than peas. Expense of setting it being nominal, and crop much surer, without expense of cultivation. Once set it holds its place as tenaciously as crab grass, but is not difficult to prevent from growing among other crops. They are easily kept back with any dull plow, but fresh crops start after plowing ceases.

MARION.—Myself and neighbors, from four years experience, have decided that the Chufa is the least profitable of any crop in cultivation for hogs, and that the St. Domingo sweet potato is the most profitable of all root crops for man, and stock of all kinds, also poultry. My neighbor, S, supplemented his corn crop last year by feeding his horses, mules, and oxen almost entirely through the winter on potatoes, and fattening his hogs on potatoes almost alone. They are fine for sheep, much more nutritious than turnips and fully five times more profitable, and require not more than one-fifth of the fertilizing. Up to this date I have kept eighty or more hogs well supplied with food on two acres of potatoes and twelve of peas sown among corn, and began the feed on the 29th of August.

RANDOLPH.—By actual account kept by Messrs Trapp and Smith, it was ascertained that pork could be raised in our county on chufas at two and a half cents per pound.

I feed my cows every winter on sweet potatoes and cotton seed boiled together and my daily yield of milk can be measured by the bushel when I attend to the milking

myself. My cows keep fat and seem thankful. I use wheat straw for long forage. For the feeding of cows cleanliness is an absolute necessity.

SUMTER.—I have been closely observing the cotton crop, and, contrary to previous convictions, I have been convinced that we need improved cotton seed. A hardier plant, that lints well and will *hold the fruit*, and, if possible, an improved staple. How would seed from Louisiana, Mississippi, or Texas, do here? [The Department distributed a considerable quantity of improved seeds last spring. Among them were Petit Gulf seed from Mississippi. The reported results of the test of these and other seeds will be given in the supplemental report.]

TERRELL.—The sweet potato is better, in this section, for feeding hogs, horses and cows, than turnips, and the yield is much better per acre, if the same amount of fertilizers is applied to potatoes that is required to make turnips. Dig when ripe, and put up in stacks of from twenty-five to thirty bushels; cover with dry earth and keep them dry, and I'll insure their keeping.

Oats will be sown more extensively, this fall, than ever before. Chufas are highly appreciated by many farmers, and the area is increasing. The stock potato is the cheapest and surest food crop grown in Southwest Georgia. Turnips are very unreliable, and won't pay as a stock feed. Pea vines, considering cost and profit, are the greatest renovator of anything we have. If properly cured, they make the best of hay.

WEBSTER.—The best plan to keep potatoes is to put them up in hills of thirty to fifty bushels. Then put on boards, bark, or anything to keep the dirt out of them. Cover well with earth and a good board shelter.

WORTH.—The caterpillar has come, in the last ten days, and cleaned up everything but the young bolls, of which there is the heaviest crop I ever saw (on the second growth.)

EAST GEORGIA.

BULLOCH.—Chufas are very profitable for hogs, but they are very injurious to land. Ground peas are better and less injurious to land. Potatoes are good for feeding all kinds of stock. They are far better than the turnip, and much easier made. The best way to keep them is to build a shelter; let the eaves come to the ground; then put a layer of potatoes, and then a layer of dirt, until all are in, and then cover well dirt.

EMANUEL.—The farmers are not making efforts to sow oats so early this year as formerly. The early sowed crop last year proved to be worse hurt by rust, I suppose to be the reason. We have plenty of the rust-proof oats saved to seed us a larger crop, which will be surely sown, as our corn crop in some sections has been cut off by drought.

GLASCOCK.—The cultivation of chufas is much increasing, as the farmers have found them to be valuable for fattening hogs. My opinion is that more pork can be raised from one acre of chufas than can be from one acre of anything else that could be planted on it, and they are easy of cultivation, not subject to any kind of blight, and will grow on any kind of land that is strong enough to bring them. The chufas should be substituted for field peas on all old flat or swampy lands. Plant between the corn rows as you would the peas, cultivate as you would the peas, and you will find them to be remunerative.

JEFFERSON.—Chufas are growing in favor, and deservedly so, as they make an excellent supplement to a short corn crop for fattening hogs.

Sweet Potatoes.—The best and cheapest root crop raised for either man or beast. I have had them on my table the year round—the old crop on my table a month after the new was dug, and equally as sound!

Pea Vines.—They unquestionably make excellent hay when gathered in due time before the leaves shed, and are a valuable and cheap fertilizer. Except clover it is perhaps the best green fertilizer known.

MONTGOMERY.—The rule to be observed in banking potatoes is, to put them in a dry place where they will not be affected by any change in the weather. They must be kept at as uniform temperature as possible, all the time. To secure this, throw up a bed of earth about six inches high, cover it with straw, pile the potatoes on the straw, and then cover the latter with dry corn stalks—after taking off the shuck. Over the stalks apply straw, and then 7 or 8 inches of earth—the deeper the better—taking the earth from round the hill so as to form a circular ditch, which will assist in preserving dryness. Put a large piece of pine bark or a wide board over the apex to keep the rain from washing down the bank. The old idea of leaving a hole in the top to let the heat escape is a great mistake. All the moisture and heat that arises from the potatoes is absorbed or neutralized by the straw, and the latter being separated from the potatoes by the stalks, the moisture cannot get back to injure the potatoes.

PLASKI.—Chufas were almost entirely unknown and uncultivated in this county until 5 or 6 years ago. They have now grown in favor, and nearly every farmer cultivates them who takes any interest in hog-raising, as they produce more feed than any known thing on the same area of land, and with less culture. While they grow well on poor land, there is nothing on which fertilizers pay better. Well fertilized and worked, they will make from 200 to 250 bushels to the acre. Sweet potatoes are also a fine hog crop; have never fed them to horses or cows. The yellow ruta бага turnip is equal or superior to potatoes for hogs and other stock, particularly in the enormous yield. But the great trouble is to get stand in July, when they should be sown: the hot sun soon kills them out.

TELFAR.—Chufas in sandy soils are the most profitable of all things grown for hogs. Potatoes are best for cows. Pea vines make the best hay and renovating crop.

TWIGGS.—My experience with chufas, as also most of my neighbors, is that they are not near so good for hogs as ground-peas or potatoes. I have ceased to plant them. I have never fed potatoes to horses, but nothing surpasses their value (except grain) when fed to cows and hogs. The turnip, with me, is a more certain crop, but do not consider an acre of them worth as much as one of potatoes. I have never had any trouble in keeping them, in a house or hills, when put up dry.

SOUTHEAST GEORGIA.

CHATHAM.—We rely very much on the sweet potato for hog food, and in some instances they are fed to horses, with good results. We are beginning to realize the importance of peas as a fertilizer. The agricultural

interest of this county is confined almost entirely to rice and truck farming. The prospect for both these interests is satisfactory.

COFFEE.—Sweet potatoes is the main crop for fattening pork, and has been for many years, though the chufa is coming into notice, and some farmers are making a success planting them.

LIBERTY.—For hogs and cattle, potatoes are a good food. A few fed to horses with their usual dry food is an advantage—*but do not drive a potato-fed horse at all fast.* Pea vines are our most valuable stock forage. On our sandy soils I do not find them valuable to turn in, though a pea crop puts the sand in superb condition for all following crops, except cotton.

Sweet potatoes far exceed turnips in certainty of yield and cost, and are best adapted for feeding hogs, horses, or cows, and I think it is a mistake that our farmers don't plant more potatoes, and thereby save corn in fattening hogs.

Pea vines pay better for a renovating crop than for hay.

Green pea vines plowed in will almost double the yield of the following crops.

TABLE I.—*Showing the condition and prospect of Cotton, Corn, etc., October 1, 1880, compared to the actual yield of 1879, etc.*

NORTH GEORGIA.

COUNTIES.	Condition & prospect compared to the actual yield of 1879.				Cotton Crop.			COUNTIES.	Condition & prospect compared to the actual yield of 1879.				Cotton Crop.		
	Cotton.	Corn.	Sugar-cane.	S'w't Potatoes.	What per cent. gathered.	Condition of that gathered.	Probable per ct. injury by caterpillars.		Cotton.	Corn.	Sugar-cane.	S'w't Potatoes.	What per cent. gathered.	Condition of that gathered.	Probable per ct. injury by caterpillars.
Banks.....	110	100	90	105	50	90	.....	Haralson.....	89	75	.....	125	35	90	.....
Bartow.....	85	83	.....	90	20	80	3	Hart.....	92	87	.....	100	45	90	.....
Catoosa.....	.....	.....	.....	.....	.....	.....	.....	Jackson.....	95	95	.....	100	125	75	120
Chattooga.....	.....	.....	.....	.....	.....	.....	.....	Lumpkin.....	125	75	.....	100	20	100	.....
Cherokee.....	79	98	80	125	33	94	.....	Madison.....	90	108	.....	110	50	100	.....
Cobb.....	80	90	.....	115	30	90	10	Milton.....	75	75	.....	110	25	50	.....
Dade.....	100	150	.....	125	50	90	.....	Murray.....	110	100	.....	100	50	100	.....
Dawson.....	.....	.....	.....	.....	.....	.....	.....	Paulding.....	90	75	.....	125	20	100	10
Fannin.....	.....	.....	.....	.....	.....	.....	.....	Pickens.....	.....	.....	.....	.....	.....	.....	.....
Floyd.....	90	100	.....	100	35	85	5	Polk.....	85	83	.....	105	25	85	1
Forsyth.....	80	88	.....	118	30	95	.....	Rabun.....	.....	.....	.....	.....	.....	.....	.....
Franklin.....	75	90	100	100	40	95	2	Towns.....	125	.....	125	.....	.....	.....	.....
Gilmer.....	.....	.....	.....	.....	.....	.....	.....	Union.....	75	.....	.....	100	.....	.....	.....
Gordon.....	100	105	.....	110	40	90	.....	Walker.....	108	118	.....	106	43	100	.....
Gwinnett.....	108	105	.....	125	30	93	.....	White.....	150	75	.....	110	15	100	.....
Habersham.....	100	90	100	98	32	97	.....	Whitfield.....	110	125	.....	110	25	100	.....
Hall.....	95	95	.....	110	25	88	.....	Average.....	96	103	92	109	33	91	1

MIDDLE GEORGIA.

Baldwin.....	.....	.....	.....	.....	.....	.....	.....	Lincoln.....	97	62	.....	95	27	85	.....
Blbo.....	90	65	70	110	60	95	.....	McDuffie.....	113	70	105	103	40	93	.....
Butts.....	90	93	.....	118	50	88	2	Meriwether.....	100	80	.....	115	40	83	.....
Campbell.....	94	87	.....	109	43	85	.....	Monroe.....	.....	.....	.....	.....	.....	.....	.....
Carroll.....	100	92	.....	110	28	82	.....	Morgan.....	187	135	.....	130	22	70	.....
Clarke.....	85	60	.....	105	40	90	.....	Newton.....	90	100	.....	125	50	75	.....
Clayton.....	100	90	.....	105	40	75	.....	Oconee.....	90	93	115	95	50	93	10
Columbia.....	90	80	.....	100	20	100	.....	Oglethorpe.....	100	120	.....	125	40	100	.....
Coweta.....	95	78	.....	118	33	90	2	Pike.....	.....	.....	.....	.....	.....	.....	.....
DeKalb.....	99	92	.....	105	45	93	2	Putnam.....	.....	.....	.....	.....	.....	.....	.....
Douglas.....	.....	.....	.....	.....	.....	.....	.....	Rockdale.....	100	75	100	80	40	80	5
Elbert.....	80	80	50	118	45	83	.....	Spalding.....	78	60	100	125	40	50	.....
Fayette.....	.....	.....	.....	.....	.....	.....	.....	Talbot.....	80	75	95	90	40	75	.....
Fulton.....	130	105	90	95	28	90	.....	Taliaferro.....	100	90	.....	125	45	90	.....
Greene.....	105	105	110	97	40	93	.....	Troup.....	85	63	95	95	45	80	3
Hancock.....	100	75	125	120	66	100	.....	Upson.....	85	70	100	100	60	80	.....
Harris.....	.....	.....	.....	.....	.....	.....	.....	Walton.....	95	90	100	100	40	75	4
Heard.....	88	75	80	115	30	78	10	Warren.....	95	78	100	105	58	90	.....
Henry.....	110	120	.....	125	40	85	.....	Wilkes.....	80	50	.....	50	95	.....	.....
Jasper.....	.....	.....	.....	.....	.....	.....	.....	Average.....	99	86	95	109	41	85	1
Jones.....	.....	.....	.....	.....	.....	.....	.....	

TABLE I—Continued.

SOUTHWEST GEORGIA.

COUNTIES.	Condition & prospect compared to the actual yield of 1879.				Cotton Crop.			COUNTIES.	Condition & prospect compared to the actual yield of 1879.				Cotton Crop.		
	Cotton.	Corn.	Sugar-cane.	Sweet Potatoes	What per ct. gathered.	Condition of that gathered.	Probable pr ct. in-jury by caterpi'r's		Cotton.	Corn.	Sugar-cane.	Sweet Potatoes	What per ct. gathered.	Condition of that gathered.	Probable pr ct. in-jury by caterpi'r's
Baker.....	133	150	90	125	60	70	15	Macon.....	100	40	75	75	80	90	10
Berrien.....	90	90	90	100	68	80	2	Marion.....	90	75	75	90	70	66	2
Brooks.....	103	97	93	103	75	85	3	Miller.....	95	75	100	120	60	100	1
Calhoun.....	95	90	102	105	47	90	9	Mitchell.....	95	75	100	120	60	100	1
Chattahoochee.	125	100	95	120	66	75	2	Muscogee.....	90	85	100	100	66	75	3
Clay.....	100	95	100	110	.....	.....	.....	Quitman.....	105	107	100	100	50	100	2
Colquitt.....	150	125	94	100	30	.....	12	Randolph.....	80	110	100	100	25	80	10
Crawford.....	85	80	92	105	45	75	8	Schley.....	97	84	102	100	45	85	2
Decatur.....	.....	.....	.....	.....	.....	.....	.....	Stewart.....	90	95	97	102	65	85	8
Dooley.....	101	82	100	100	50	100	.....	Sumter.....	100	60	100	125	75	75	.....
Dougherty.....	.....	.....	.....	.....	.....	.....	.....	Taylor.....	100	90	100	100	50	80	.....
Early.....	.....	.....	.....	.....	.....	.....	.....	Terrell.....	93	90	85	105	65	90	5
Houston.....	.....	.....	.....	.....	.....	.....	.....	Thomas.....	.....	.....	.....	.....	.....	.....	.....
Irwin.....	115	120	92	115	66	69	1	Webster.....	.....	.....	.....	.....	.....	.....	.....
Lee.....	.....	.....	.....	.....	.....	.....	.....	Wilcox.....	.....	.....	.....	.....	.....	.....	.....
Lowndes.....	.....	.....	.....	.....	.....	.....	.....	Worth.....	.....	.....	.....	.....	.....	.....	.....
Average.....								Average.....							

EAST GEORGIA.

Bulloch.....	90	75	80	100	45	100	.....	Pulaski.....	95	80	110	110	60	75	1
Burke.....	80	100	100	110	25	90	.....	Richmond.....	90	72	.....	80	75	90	.....
Dodge.....	75	80	125	100	60	100	.....	Screven.....	75	30	50	50	50	90	10
Emanuel.....	90	85	100	100	60	90	.....	Tatnall.....	.....	.....	.....	.....	.....	.....	.....
Glascock.....	75	75	100	100	75	100	.....	Telfair.....	114	95	110	110	62	92	3
Jefferson.....	98	75	99	100	42	97	.....	Twiggs.....	95	95	97	95	85	80	2
Johnson.....	100	70	110	90	50	.....	Washington.....	100	80	100	100	40	110	.....	.....
Lanterns.....	.....	.....	.....	.....	.....	.....	.....	Wilkinson.....	100	80	100	115	50	75	.....
Montgom'y.....	96	80	91	100	69	93	1	Average.....							

SOUTHEAST GEORGIA.

Appling.....	95	100	100	100	25	100	.....	Ettingham.....	110	100	100	100	75	95	.....
Bryan.....	.....	.....	.....	.....	.....	.....	.....	Glynn.....	90	90	95	100	77	90	5
Camden.....	.....	.....	.....	.....	.....	.....	.....	Liberty.....	.....	.....	.....	.....	.....	.....	.....
Charlton.....	.....	.....	.....	.....	.....	.....	.....	McIntosh.....	125	110	100	150	50	90	10
Chatham.....	67	95	100	.....	.....	.....	.....	Pierce.....	.....	.....	.....	.....	.....	.....	.....
Glascock.....	100	102	100	101	75	95	10	Ware.....	.....	.....	.....	.....	.....	.....	.....
Coffee.....	80	110	100	125	60	100	10	Wayne.....	.....	.....	.....	.....	.....	.....	.....
Echols.....	.....	.....	.....	.....	.....	.....	.....	Average.....							

RECAPITULATION.

NORTH GEORGIA.....	96	103	92	109	33	91	1
MIDDLE GEORGIA.....	99	86	90	109	41	85	1
SOUTHWEST GEORGIA.....	101	95	95	111	56	82	5
EAST GEORGIA.....	93	82	93	100	56	86	0.5
SOUTHEAST GEORGIA.....	95	95	98	104	62	96	5
General Average.....	97	92	95	108	46	87	2

SUMMARY OF WEATHER REPORTS FOR SEPT. 1880.

NORTH GEORGIA.

STATIONS.	Max. Temperature.	Min. Temperature.	Mean Temperature.	Total Rainfall.	Last Good Season.	Days on which rain fell.
Canton.....	80.0	50.0	66.0	7.40	Sept. 27.	1, 2, 9, 10, 24, 26, 27.
Ellerslie.....	84.0	48.0	68.1	6.50	Sept. 28.	1, 2, 7, 8, 9, 11, 12, 13, 24, 25, 27, 28.
Gainesville.....	85.0	46.0	68.6	4.27	Sept. 27.	1, 2, 7, 8, 9, 11, 12, 13, 24, 25, 27.
Leo (White county).....	86.0	45.0	68.7	5.71	Sept. 27.	1, 2, 7, 8, 11, 13, 24, 27.
Mt. Airy.....	82.0	45.0	63.8	5.50	Sept. 27.	1, 2, 4, 7, 8, 11, 24, 27.
Rabun Gap.....	86.0	46.0	70.1	5.12	Sept. 28.	2, 7, 11, 13, 28.
Rome.....						
Toccoa.....						
Means.....	83.8	46.7	67.5	5.75		

MIDDLE GEORGIA.

Athens.....						
Atlanta.....	88.0	47.0	69.1	5.98	Sept. 24.	1, 5, 6, 7, 8, 11, 12, 13, 24, 25, 27.
Carrollton.....	88.0	46.0	69.5	5.90	Sept. 27.	2, 5, 6, 8, 11, 13, 24, 27.
LaGrange.....	92.0	52.0	66.9	2.10	Sept. 23.	6, 3, 11, 13, 23, 24, 27.
Macon.....						
Oxford.....	86.0	56.0	70.9	4.90	Sept. 27.	8, 11, 13, 24, 25, 27.
Thomson.....	90.0	55.0	74.3	1.40	Sept. 11.	1, 2, 11.
Means.....	88.8	51.2	70.1	4.05		

SOUTHWEST GEORGIA.

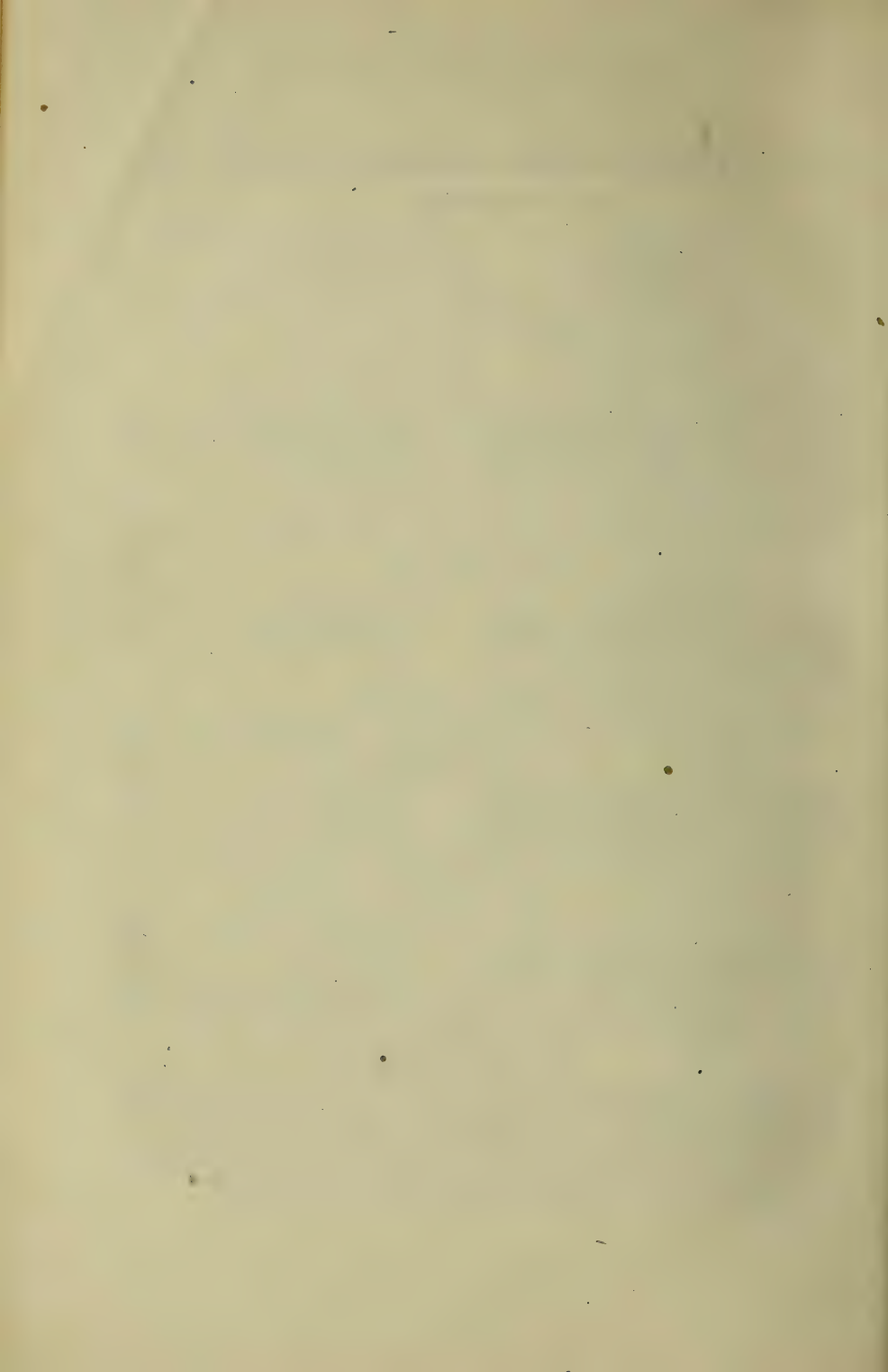
Americus.....	88.0	60.0	75.5	1.35	Aug. 30	8, 13, 27.
Cuthbert.....	89.0	60.0	79.5	3.50	Sept. 25.	3, 13, 24, 25.
Nashville.....	90.0	62.0	78.0	3.30	Sept. 13.	1, 8, 11, 13.
Thomasville.....	90.0	60.0	75.4	2.67	Sept. 13.	1, 2, 8, 11, 12, 13, 25, 26, 27.
Means.....	89.2	60.5	77.0	2.70		

EAST GEORGIA.

Augusta.....	88.0	53.0	73.0	1.55	Sept. 11.	1, 6, 11, 13.
Chauncey (Dodge Co.).....	94.0	58.0	80.8	3.20	Sept. 13.	1, 2, 8, 13.
Ogeechee.....	91.0	60.0	75.3	0.75	Aug. 31.	2, 8, 27.
Swainsboro.....	94.0	60.0	77.0	1.66	Sept. 27.	1, 27.
Means.....	91.0	57.0	76.3	1.83		

SOUTHEAST GEORGIA.

Blackshear.....						
Brunswick.....	88.0	64.0	76.0	6.45	Sept. 13.	7, 8, 10, 11, 12, 13.
St. Mary's.....						
Walthourville.....	90.0	61.0	74.1	4.92	Sept. 13.	1, 7 to 13, 28.
Means.....	89.0	67.5	75.0	5.73		
Means for State.....	87.7	53.7	72.1	4.12		



ANNUAL REPORT

OF THE

COMMISSIONER OF AGRICULTURE

OF THE

STATE OF GEORGIA.

J. T. HENDERSON, COMMISSIONER.

ATLANTA, GA.:

JAS. P. HARRISON & CO., PRINTERS AND PUBLISHERS.

1880.



REPORT.

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA., Oct. 15th, 1880.

To His Excellency, A. H. COLQUITT, Governor:

SIR:—In compliance with law I have the honor of submitting the following report for the first year of my administration of the Department of Agriculture:

ORGANIZATION.

Mr. Wm. H. Howell was appointed Clerk of the Department, Col. R. J. Redding, Assistant Commissioner, and Mr. J. S. Newman, Editing Clerk. These gentlemen have constituted the clerical force of the office. Mr. Pitt M. Brown was appointed to take charge of the mineralogical collection placed under the charge of the Commissioner of Agriculture by resolution of the General Assembly.

CHEMIST.

Dr. N. A. Pratt was appointed State Chemist on the 12th of Nov., 1879, in the vacancy occasioned by the resignation of Dr. W. J. Land.

Finding it impossible for one chemist to perform the work required under the act of 1877 in time to furnish the desired information to the farmers in advance of their purchases, Prof. H. C. White, of the University of Georgia, will be appointed analytical chemist of the department, with

the understanding that a number of past graduates will be engaged in the work of analyzing fertilizers during the pressing season, and in making such other analyses as may be required at other times.

The superior completeness of the laboratory of the University will, it is thought, expedite the chemical work of the department.

This arrangement was not intended to, and does not, reflect in the least upon Dr. N. A. Pratt, the present analytical chemist of the Department of Agriculture, who has performed all work required of him in the most skillful and satisfactory manner, but it has been made with the hope of accomplishing the work required by law more expeditiously. It has been found to be a physical impossibility for one chemist to do the work required during the active fertilizer season. Notwithstanding Dr. Pratt labored far into the night during the last season, he found it necessary to employ assistants for several months.

Besides the above consideration of expediency, it is hoped and believed that the connection of the analysis of fertilizers and that of other substances with the State College of Agriculture and the Mechanic Arts will prove of great value to the students of the college.

INSPECTORS OF FERTILIZERS.

For the season of 1879–80 the following inspectors were appointed, viz:

COL. O. T. ROGERS.....	At Savannah.
DR. W. P. HARDEN.....	At Augusta.
DR. J. S. LAWTON.....	At Atlanta.
CAPT. TROUP BUTLER.....	At Brunswick.
GEN. E. L. THOMAS.....	At Macon.
MR. G. W. ROSETTE.....	At Columbus.

The only change made for the season of 1880–81 will be the appointment of Hon. Samuel Hawkins at Augusta, in the place of Dr. W. P. Harden, resigned.

SUPERINTENDENT OF FISHERIES.

Dr. H. H. Cary, of Troup county, was appointed Superintendent of Fisheries, January 14th, 1880, and has discharged the duties of that position with energy and fidelity, *without salary*, since that time.

INSPECTION AND ANALYSIS OF FERTILIZERS.

The fertilizer trade of the State has grown to such proportions that much of the time of the clerical force of the office for four months during winter and spring is required to keep the records and conduct the correspondence arising from it, the labor imposed upon inspectors is much greater than formerly, and that required of the chemist excessive in amount.

The difficulties and expenses of the chemist were seriously increased by the necessity of refitting the Laboratory, long in disuse, after the season had commenced, and the results of his analyses being generally lower than those of his predecessor, it was not until his work was repeatedly verified by the most experienced chemists in the United States, that manufacturers and dealers were satisfied as to its correctness and accuracy.

CONVENTION OF CHEMISTS.

It was in consequence of the discrepancy in the methods used by different chemists in the analysis of commercial fertilizers that I called a Convention of Agricultural Commissioners and Chemists at Washington, D. C. The following circulars will explain, in brief, the object of the Convention:

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA., May 20, 1880.

DEAR SIR—The experience of the last fertilizer season, has suggested to my mind the importance of securing such uniformity of method in determining, by chemical analysis

the percentage of valuable ingredients in commercial fertilizers, as will give more uniform, and hence, more satisfactory, results. This is especially desirable in determining Reverted Phosphoric Acid.

With a view to accomplishing so desirable an object, as well as others which may be deemed proper, I have the honor to suggest the calling of a Convention of the several Commissioners of Agriculture, State Chemists, and Professors of Chemistry in State Universities and State Agricultural Colleges, in those States using large amounts of commercial fertilizers, to meet at some convenient point early in the month of July next.

I would be glad to have your views on the subject; and if favorable to the suggestion, please nominate some gentleman, who, by general assent, may be informally authorized to fix the time and place of such Convention, and issue the necessary notices.

You are also requested to give me the names and post-offices of gentlemen in your State, holding either of the positions above indicated, which do not appear in the list below, that copies of this circular may be sent to them.

An early reply is desirable.

Very respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA., July 1, 1880.

DEAR SIR—I am gratified to announce that the recent circular letter which I had the honor to issue, suggesting the calling of a Convention for the purpose of adopting a uniform system for the analysis of commercial fertilizers, has met with favorable responses from a large majority of the gentlemen to whom it was sent. A like majority has imposed on me the duty of fixing the time and place of

said Convention and issuing the necessary notices for the same. After correspondence with others, and due consideration of the interests involved, I have decided upon Wednesday, the 28th of July, as the time, and Washington, D. C., as the place for the assembling of the proposed Convention. You are, accordingly, respectfully and earnestly invited to be present and participate in the Convention.

Every reasonable facility for the deliberations of the Convention will be afforded by the Hon. Wm. G. LeDuc, Commissioner of Agriculture, who is in hearty sympathy with the object sought to be accomplished. I have appended hereto a list of the names of gentlemen to whom this circular will be sent.

Trusting that you will find it convenient to attend and give the Convention the benefit of your experience, and *requesting that you will at once inform me by letter whether you will attend*, I am, respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

PROCEEDINGS.

LIBRARY HALL, July 28, 1880.

In response to these circulars there assembled—in one of the spacious halls of the Department of Agriculture, which was kindly set apart by the Commissioner of Agriculture—the following gentlemen:

Prof. R. M. Ballentine, United States Department of Agriculture.

Dr. C. Elton Buck, Manufacturing Chemist, Wilmington, Del.

Hon. A. P. Butler, Commissioner of Agriculture, State of South Carolina.

Dr. Peter Collier, Chemist of the United States Department of Agriculture.

Dr. M. G. Ellzey, Professor Virginia Agricultural and Mechanical College.

Mr. C. A. Goessman, Agricultural College, Amherst, Mass.

Prof. W. M. Habirshaw, Analytical Chemist, New York City.

Hon. J. T. Henderson, Commissioner of Agriculture, State of Georgia.

Dr. E. H. Jenkins, Connecticut Agricultural Experiment Station.

Dr. A. R. Ledoux, North Carolina Agricultural Experiment Station.

Dr. G. A. Liebig, Analytical and Manufacturing Chemist, Baltimore, Md.

Prof. Arthur T. Neale, New Jersey State Experiment Station.

Dr. N. A. Pratt, State Chemist, Georgia.

Prof. R. W. L. Rasin, Manufacturing Chemist, Baltimore, Md.

Dr. Charles U. Shepard, Jr., Chemist, State of South Carolina.

Dr. W. Simon, Analytical Chemist, Baltimore, Md.

Dr. C. C. Wellington, United States Department of Agriculture.

Dr. H. C. White, Prof. University of Georgia.

Dr. P. B. Wilson, Analytical Chemist, Baltimore, Md.

Dr. Theo. R. Wolf, Prof. and State Chemist, Delaware.

The Convention was called to order at 3.30 P. M., by Dr. C. U. Shepard, Jr., who nominated Hon. J. T. Henderson for President of the Convention, reminding the gentlemen that it was owing to Judge Henderson's earnest efforts that they were brought together. Judge Henderson, being called to the chair, after thanking the Convention for the honor done him, stated the object of the meeting as substantially set forth in the circulars above given.

Dr. A. H. Ledoux was then elected Secretary of the meeting.

Dr. M. G. Ellzey addressed the Convention, saying that he heartily endorsed the effort which Judge Henderson was making to secure uniformity in the analysis of commercial fertilizers. He recognized the need of some general understanding in the matter, and hoped that the discussions would take no limited range, but deal with more than one of the questions which have been the cause of difficulty between producers and farmers throughout the country.

Letters were read from Prof. S. W. Johnson, of New Haven, and others, heartily endorsing the object of the meeting, and thanking Judge Henderson for his action in calling the same.

On motion of Dr. Ellzey the chair appointed a committee on a programme, or order of business, to recommend to the Convention what topics should be discussed. The following committee was appointed: Drs. Goessman, Buck, and White. The committee recommended the following programme. The report was received and adopted.

PROGRAMME.

1. Preparation of the roll of the Convention, and decision of the rights of parties present to participate in the discussion of various topics, and to vote upon the final judgment of the same.

2. Discussion of the method of estimating soluble phosphoric acid.

3. Discussion of method of estimating "reverted" phosphoric acid.

4. Estimation of insoluble phosphoric acid.

5. Estimation of nitrogen.

6. Estimation of potash.

The Committee consider the above the main topics which should receive the consideration of the Convention.

Other points proper for discussion, should time allow, are, perhaps, as follows:

7. Method of arriving at commercial valuations.

8. Agricultural and commercial valuation of "reverted" phosphoric acid.

In accordance with section 1 of the Order of Business, the Secretary was ordered to make out and read the roll of the Convention, together with the occupations and professions of the gentlemen present.

Dr. White moved that only those who are practicing, analytical chemists be considered entitled to vote on the final judgment of the meeting.

Dr. Ellzey opposed the motion, saying that he would very much regret to see the Convention limited in that way.

The Secretary called attention to the fact that all the gentlemen present, but three, were practicing, analytical chemists, and entitled to vote under the resolution.

After some further discussion, the resolution was adopted.

The Convention then, on motion, took up the discussion of the 2nd section of the programme—determination of soluble phosphoric acid.

Drs. Goessman and Ellzey gave their opinions as to the extent and direction which the discussion should have.

It was moved by Dr. Ledoux that a committee of three be appointed by the chair to propose to the Convention a method for the determination of soluble phosphoric acid.

Dr. Collier moved to amend, by substituting "five" for "three."

Dr. Shepard moved, as a substitute, that the entire question of the determination of phosphoric acid, in all its forms, be referred to a committee of five.

After discussion, the following resolution was adopted:

Resolved, That a committee of five be appointed by

the chair to consider sections 2, 3 and 4 of the Order of Business, and report thereon."

The following gentlemen were appointed by the chair: Drs. Shepard, Goessman, Liebig, Jenkins and Wolf.

On motion of Dr. White it was ordered that a committee of five be appointed to take into consideration sections 5 and 6 of the Order of Business and report thereon. Drs. Habirshaw, Wilson, Neale, Buck and Pratt were appointed.

On motion, section 5 of the Order of Business was amended so as to include nitrates.

The convention then took a recess until 6.30 P. M., to allow the committee time to report.

The Convention came to order at 7 P. M. The committee on sections 2, 3 and 4 (Phosphoric Acid) offered the following report, which, after reading and being discussed by several gentlemen at length, was received and adopted.

REPORT.

It is recommended by your committee to whom was referred the selection of a method for the determination of Phosphoric Acid in commercial manures,

That this convention shall agree to adopt, *provisionally*, the methods recommended by Fresenius, Neubauer and Luck in their article "On the best methods for the analysis of artificial manures."

Zeitschrift fur Analytische Chemie, X pg. 133, *with the following suggestions*:

1. That the flask containing the residue (after the extraction of the Soluble Phosphoric Acid) and the solution of citrate be introduced into a *cold* water bath, whose temperature shall be rapidly raised to 40° C., and there maintained for *one half hour*, the flask being shaken every five minutes.

2. That the determination of the "*Reduced*" Phosphoric Acid be *indirect*.

3. That all the determinations be *gravimetric*.

4. That a committee of two—to be named by the chairman—be appointed to prepare, on the above basis, a detailed method for the analysis of commercial manures, and to distribute the same among the members of this convention and others interested by this action.

CHARLES U. SHEPARD, JR.,
Chairman of Committee.

The following report of the committee on sections 5 and 6 of the programme (Nitrogen and Potash) was received and adopted.

REPORT

Of Committee on Estimation of Nitrogen and Potash in Commercial Manures:

I. Determination of nitrogen (total):

- (a). when the three (3) forms of nitrogen are present (nitrates, ammonia salts, and organic nitrogen), a combustion with oxide of copper or plumbic chromate.
- (b). When nitrates are not present, a combustion with soda-lime and the resulting ammonia estimated with Platinum chloride or titrated with a normal solution (alkali).

II. Determination of nitric acids when in presence of ammonia salts and organic nitrogen:

- (a). Nitrates and ammonia salts are brought into water solution and the nitric acid is converted into ammonia by Harcourt & Siewert's process.—(Fres. Zeits., 1871, 334; Jour. Chem. Soc., 1862, 381; An. Chem. und Phar., 125, 293; Sutton Volumetric Analysis, London, 3d Ed., 1876, 102 *et seq.*)
- (b). Nitrates are brought into water solution and the nitric acid estimated by Schlossing's method, modified by Schultz, viz: distillation in presence of Ferrous chloride with excess of hydro. chloric

acid. The N. O. gas is collected and measured.—
(Schlossing's Original Paper, *Annal de Chim.*, 3
ser. tom. 40-479; *Jour. fur Pract. Chemi.* 62-142.)

III. Determination of nitrogen existing as ammonia salts:
The solution in water is distilled with magnesium
oxide and the ammonia estimated either by the
Platinum method, or by titration with normal acid.

IV. Determination of the nitrogen when existing in a
substance, in separate forms, as nitrates, ammonia
salts and organic nitrogen :

- (a). Estimation of total nitrogen by I. a.
- (b). do nitric acid by II-b or II-a.
- (c). do ammonia salts, III.
- (d). do organic nitrogen by difference.

V. Estimation of potash :

Only salts of potash soluble in water are considered in
this report (except when the potash occurs in seeds, in
which case previous calcination is recommended).

- (a). Solution in water, removal of sulphates, phosphates
and magnesia by Barium hydrate, clearing with ox-
alate or carb. ammonia and precipitating with
Platinum chloride.

W. M. HABIRSHAW, *Chairman.*

On motion, it was ordered that the two reports be re-
ferred to a committee of two, who should copy them,
giving *details* of the methods to be employed, and to send
to each member of the Convention a copy of the same.

On motion, a letter of Dr. S. A. Goodale was consid-
ered and referred to the above committee.

After remarks and discussion of the above reports, it
was suggested that, since so many agricultural chemists
were present, it would be desirable to effect a permanent
organization, to meet from time to time and discuss topics
of interest to the profession. Dr. Goessman offered the
following resolution:

“Resolved, That this Convention form a section in the sub-division of Chemistry in the American Association for the Advancement of Science, and that their next meeting be held in Boston, during the regular meeting of the aforesaid Association.”

On motion, Dr. Goessmann's resolution was adopted, Dr. Shepard thought it would be well to refer the matter to a committee to draw up a plan for a permanent organization, and offered a resolution to that effect. Drs. Goessman and Wilson were appointed to arrange for a permanent organization of the Convention, as called for in the resolution of Dr. Shepard.

On motion, section 7, of the Order of Business was taken up by the Convention. A long discussion followed, which was participated in by Drs. Ellzey, Collier, Jenkins and others. No final action was taken upon this section, but it will be further considered at the forthcoming meeting of the Convention in Boston. The Committee on Permanent Organization made the following report which was received and adopted:

REPORT.

The Committee on Permanent Organization propose that Dr. Goessman be made Chairman until the next annual meeting in connection with the American Association for the Advancement of Science, and that Dr. Ledoux be appointed Secretary.

P. B. WILSON, *Chairman.*

On motion, the thanks of the Convention were tendered Judge Henderson for his courtesy and skill as presiding officer.

On motion, the following resolution was unanimously adopted:

Resolved, That the thanks of this Convention are hereby tendered to General LeDuc, Commissioner of Agriculture for his courtesy; and, also, to Prof. Collier, the Chemist of the Department, for his kindness and attention.

On motion the Convention adjourned.

The committee who were appointed to write out the details of the methods of determination of Phosphoric Acid have forwarded to the Secretary the following

REPORT.

Method for the Determination of Phosphoric Acid in Commercial Manures.

1. Preparation of the sample. It is not to be ground, but may be broken up by hand, and should be thoroughly mixed as rapidly as possible, and transferred to a tightly stopped bottle.

2. Determination of the Soluble and "Undecomposed" Phosphoric Acid.

(a) Two grammes of the material, transferred to a suitable vessel, are rubbed up with a small quantity of cold water, (carefully avoiding any pulverization) transferred to a filter, and there washed with cold water, which is added at first in small successive portions, until the washings no longer react acid.

Soluble Phosphoric Acid is determined in the filtrate.

(b) The filter, containing the "Reverted" and "Undecomposed" Phosphates is carefully spread on a glass-plate. With the aid of a wash-bottle containing one hundred cubic centimeters of a perfectly neutral solution of Ammonium Citrate, (sp. gr. 1.09) the residue is washed into a lipped porcelain mortar. The coarser portions are allowed to settle, and the fluid, with the suspended particles, is poured into a small flask. The residue remaining in the mortar is rubbed to a very fine paste and brought with the remainder of the Ammonium Citrate into the flask, which is then corked.

This flask is put into a cold water-bath, the temperature is rapidly raised to 40° C., and there maintained for one half hour, care being taken to shake the flask every five minutes. It is then removed and the contents immediately filtered.

The residue is washed two or three times with a mixture of equal parts of water and Ammonia Citrate solution, and used for the determination of "Undecomposed" Phosphoric Acid.

3. The total Phosphoric Acid is determined in a separate portion of 1—2 grammes.

The other details are as given by Fresenius, Neubauer and Luck, (*loc. cit.*)

The committee have read with great interest the communication of Dr. S. L. Goodale, referred to them, and beg leave to return it to the Secretary for presentation at a future meeting of the Convention, when its contents may receive the attention they deserve.

CHARLES U. SHEPARD, Jr.,
EWD. H. JENKINS,

Committee.

The above is respectfully submitted.

A. R. LEDOUX, *Secretary.*

J. T. HENDERSON, *Chairman.*

It is believed that the results of the labors of this Convention will greatly facilitate the chemical work in connection with the inspection and analysis of commercial fertilizers, since the adoption of a uniform system by all chemists, private and official, will remove the difficulties hitherto encountered, resulting from the employment of different methods giving widely different results.

Anxious to do full justice to all parties at interest, numerous verifications of results have been made for the satisfaction of manufacturers and dealers, when I was satisfied the fault was either with their chemists or in the different methods employed.

The uniform method to be employed by all the chemists in future will render fewer verifications necessary and hence give more time for original work.

In order to convey more clearly an idea of the amount of work involved in the analysis of fertilizers, I submit the following

REPORT OF THE CHEMIST.

GEORGIA STATE LABORATORY,
ATLANTA, July 20, 1880.

HON. J. T. HENDERSON, *Commissioner of Agriculture* :

DEAR SIR :—Pursuant to your orders, I have the honor to present herewith a Report of Operations and work done for the Department of Agriculture during the past season, together with a few reflections suggested by the results attained.

Your chemist received his appointment on November 12, 1879, nearly six weeks after the season had opened, and at once proceeded to put the Laboratory into fair working order. This Laboratory, originally supplied only for the analysis of soils, after three years' disuse, was in a shockingly bad condition, and required entire refitting before any reliable work could be attempted. Furnaces, water-pipes sinks, balances, boilers, etc., all were overhauled and refitted, and a fresh supply of chemicals and apparatus ordered. It was the middle of December before systematic work could be commenced.

Up to this date the work done is as follows :

Fertilizer Analyses—regular.....	211
Fertilizer analyses—revisions.....	66
Mineral analyses.....	4
Mineral water analyses.....	1
Total.....	276

The amount of labor involved in this work is best exhibited in the following table of analysis, or separate determinations made.

ANALYSES.

Phosphoric acid—soluble.....	266
Phosphoric acid—reverted.....	266
Phosphoric acid—insoluble	266

Phosphoric acid—total.....	251
Potash	176
Ammonia.....	192
Moisture.....	277
Nitric acid.....	6
Sulphuric, silicic acids, lime, magnesia, etc.....	47
Total determinations.....	1747

This amount of chemical work, in the time allowed for it, is far beyond the capacity of any one man, and I have only been able to accomplish it by reason of the labors of two, and sometimes three, assistants; in covering the expense of which you have generously assisted me. Exclusive of your assistance, I have been to an expense of about \$1,200, exclusive of rent, chemicals, etc.

The experience of the season induces me to say :

1. That the fertilizers offered on this market, while mostly coming up to the minimum required by law, present a wonderful variation in quality by reason both of the material used in the manufacture and the percentage of valuable ingredients contained. The acid phosphates range all along from 16.30 per cent. to 6.50 per cent. of available phosphoric acid. The guanos, from 13 per cent. to 5 per cent. of phosphoric acid, and from 7 per cent. to less than 2 per cent. of ammonia, and from 3 per cent. to less than 1 per cent. of potash, and still these, each of its own class, respectively, are sold to the farmer at practically the same price.

2. In regard to the inspections, my observation, so far as it goes, shows that they have been well and carefully made. Revisions and analysis of samples of the same fertilizer, under different inspections, have given nearly uniform results; and samples drawn by myself, from lots already inspected, have yielded results varying but slightly from those drawn by your inspectors.

3. The low price of nitrate of soda, notwithstanding the Chili-Peruvian war, has induced some manufacturers to add

this salt as part of their ammoniating material; and they ask that, under the law, the nitric acid contained be counted at its equivalent in ammonia (100 parts of refined nitrate of soda contains nitrogen equivalent to 20 parts of ammonia). Their claim is a just one, and worthy your consideration, even though its estimation adds 25 per cent. to the cost and labor of an analysis.

4. The question of what should be considered "reverted" phosphoric acid, under the law, is an important one. As it has your attention, and will soon be discussed in a convention of chemists, which you have the pleasure to have succeeded in calling together, I will not refer to it here.

I have the honor to be very respectfully, your obedient servant,

N. A. PRATT.

The following extract from Circular No. 9, Analysis and Statistics of Commercial Fertilizers, will give an insight into the statistics of the inspection and analysis of fertilizers in the State:

During the season of 1879-80 there were 119,583.06 tons of commercial fertilizers inspected and analyzed for the Georgia market, all of which, with the exception of 40 tons, were admitted to sale. The following table shows the amount inspected by each inspector:

O. T. Rogers, Inspector at Savannah.....	35,376.70 tons.
W. P. Harden, Inspector at Augusta.....	33,189.78 "
J. S. Lawton, Inspector at Atlanta.....	17,243.06 "
Troup Butler, Inspector at Brunswick.....	22,823.82 "
E. L. Thomas, Inspector at Macon.....	6,219.30 "
G. W. Rosette, Inspector at Columbus.....	4,739.40 "

Total.....119,583.06 tons.

Although distinct inspections were made and samples drawn of each brand, a considerable number are duplicates, differing only in name, being actually taken from the same bulk, and branded according to the fancy of

dealers. A number of manufacturers have no proprietary brands, and do not sell, directly or through agents, to farmers, but to nominal manufacturers, who sell them under their own brands. One large manufacturer sells one fertilizer under no less than twelve different names.

The following table shows the number of distinct inspections made by each inspector for the season, the average number of tons in each inspection, the whole number of inspections made, and the average of each :

	Number of Inspections.	Average Am't of each Inspection.
O. T. Rogers.....	261	135 tons.
W. P. Harden.....	142	233 "
J. S. Lawton.....	151	114 "
T. Butler.....	193	118 "
E. L. Thomas.....	43	144 "
G. W. Rosette.....	60	79 "
Total.....	850	140 tons.

CONDEMNED FERTILIZERS.

Of the above amount, 40 tons, comprising three brands, were shown, by analysis, to contain less than the minimum percentages of ammonia and phosphoric acid required by law, and the sale thereof was accordingly forbidden by the Commissioner of Agriculture, in pursuance to section 2d of the act of 1877, from which the following is an extract :

"It shall be the duty of the Commissioner of Agriculture to forbid the sale of any Acid Phosphate or Dissolved Bone, which is shown by official analysis to contain less than ten per centum of available Phosphoric Acid; and also to forbid the sale of any Ammoniated Superphosphate, which is shown by official analysis to contain less than eight per centum of available Phosphoric Acid and two per centum of Ammonia."

At the time of making application for an inspection,

and in "consideration of being allowed to proceed to sell and distribute the same before the official analysis thereof is made," the dealer or applicant is required to give a written obligation whereby he agrees and binds himself "to cancel and make null and void all sales that may be made thereof, and forfeit all right to compensation therefor, if, after the official analysis is made, the Commissioner of Agriculture shall prohibit its sale in accordance with law" These written obligations in every case, are on file in the office of the Commissioner.

COMPARATIVE TRADE IN FERTILIZERS.

The following table shows the number of tons inspected for each of the last five seasons :

There were inspected for the season of 1875-6.....	55,316 tons.
There were inspected for the season of 1876-7.....	75,824 tons.
There were inspected for the season of 1877-8.....	93,478 tons.
There were inspected for the season of 1878-9.....	85,049 tons.
There were inspected for the season of 1879-80.....	119,583 tons.

AMMONIATED AND NON-AMMONIATED FERTILIZERS OR ACID PHOSPHATES.

Of the whole amount of fertilizers placed upon the market during the past season 104,838 tons were *Ammoniated Superphosphates*, and 13,906 tons were *Acid Phosphates* or *Dissolved Bones*. It is well to remark that those brands, which contain not less than eight per cent. of available phosphoric acid and two per cent. of ammonia, are classed as *Ammoniated Superphosphates*; and those containing less than two per cent. of Ammonia, and not less than ten per cent. of available phosphoric acid, are classed as *Acid Phosphates* or *Dissolved Bones*. This classification is made without regard to the *name* of the brand, as will be seen by reference to the tables. Those fertilizing materials which do not claim to be either of the foregoing, are classed as *chemicals and compounds other*

than *Ammoniated Superphosphates and Dissolved Bones*. Of this class there were 839 tons inspected and analyzed.

The number of tons of Acid Phosphates or Dissolved Bones used in Georgia during the past five seasons is as follows :

For the season of 1875-6.....	6,499 tons.
For the season of 1876-7.....	12,842 tons.
For the season of 1877-8.....	15,332 tons.
For the season of 1878-9.....	10,291 tons.
For the season of 1879-80.....	13,906 tons.

Of the whole quantity put upon the market, the percentage of Acid Phosphates for each season is as follows :

For 1875-6.....	11.66 per cent.
For 1876-7.....	12.82 per cent.
For 1877-78.....	19.62 per cent.
For 1878-79.....	12.22 per cent.
For 1879-80.....	11.63 per cent.

The following tabulated averages for the past five seasons will be found interesting, viz :

GENERAL AVERAGES OF ALL FERTILIZERS.*

	Available Phosphoric Acid.	Ammonia.	Potash.	Relative Commercial Value.
For the season of 1874-75....	9.23	2.55	5.17	
For the season of 1875-76....	10.94	2.53	2.49	
For the season of 1876-77....	10.87	2.52	2.75	\$35 51
For the season of 1877-78....	11.43	2.79	2.23	37 38
For the season of 1878-79....	11.95	2.70	1.66	38 31
For the season of 1879-80....	10.24	2.58	1.33	34 17

These are *general* averages of all fertilizers, including *acid phosphates*, for the seasons named. The commercial values are all based upon the present valuations, per pound, of the valuable ingredients in fertilizers.

It is proper to remark that the averages of *Ammonia* and *Potash* are of those brands *only* which are shown by analysis to contain these elements, and not of the whole number of brands analyzed.

AVERAGES OF AMMONIATED FERTILIZERS.

	Available Phosphoric Acid.	Ammonia.	Potash.	Relative Commercial Value.
For the season of 1874-5.....	8.73	2.84	5.31	
For the season of 1875-6.....	10.36	2.98	2.79	
For the season of 1876-7.....	10.51	2.73	2.43	\$36 82
For the season of 1877-8.....	10.83	2.79	2.25	38 36
For the season of 1878-9.....	11.52	2.70	1.64	39 76
For the season of 1879-80.....	9.53	2.59	1.35	34 78

AVERAGES OF NON-AMMONIATED FERTILIZERS.

	Available Phosphoric Acid.	Potash.	Relative Commercial Value.
Season of 1874-5.....	11.05	3.85	
Season of 1875-6	11.99	4.64	
Season of 1876-7.....	11.68	4.54	32.57
Season of 1877-8.....	13.10	2.16	34.51
Season of 1878-9.....	13.20	1.63	33.98
Season of 1879-80.....	12.44	1.28	32.41

*The averages of valuable ingredients for the years 1874-5 to 1878-9, inclusive, were taken from similar exhibits in Circular 67 (old series). The *average* "commercial value" given in that circular (page 11), instead of being an average of the calculated values of all the brands of each season is found, on examination, to have been the *calculated value* of the average of all the analysis of such season. The method there employed was wrong in principle, and failed to present a just comparative view. In the exhibit presented above, the calculations have been revised and corrected, and, in addition, are based on the same classification of fertilizers adopted in this Circular.

The average values for the seasons 1874-5, 1875-6, are not given, because the prices of elements were different.

The number of brands inspected, analyzed and placed upon the market, for each season since the organization of the Department, is as follows:

For the season of 1874-75.....	110 brands
For the Season of 1875-76.....	101 brands
For the Season of 1876-77.....	125 brands
For the Season of 1877-78.....	127 brands
For the Season of 1878-79.....	162 brands
For the Season of 1879-80.....	182 brands

These are exclusive of chemicals and other preparations for making or composting manures at home.

The number of brands of Ammoniated and Non-Ammoniated Fertilizers for each season is as follows:

	Am'd.	Non-Am'd.
For the Season of 1874-75.....	86	
For the Season of 1875-76.....	68	33
For the Season of 1876-77.....	85	40
For the Season of 1877-78.....	90	37
For the Season of 1878-79.....	119	43
For the Season of 1879-80.....	135	47

RECEIPTS AND EXPENDITURES INCIDENT TO THE INSPECTION
OF FERTILIZERS, SEASON OF 1879-80.

Fees on 119,583.06 tons Inspected during the season.....	\$59,791 53
Inspectors' salaries to Sept. 1, 1880.....	\$4,871 17
Chemists' salaries to Sept. 1, 1880.....	2,900 00
Cost of 1,279,200 Inspectors' Tags.....	2,582 00
Total expenses of inspection.....	\$10,353 17
Leaving a net balance in the Treasury of.....	49,438 36
	<hr/>
	\$59,791 53—\$59,791 53

It is proper to remark, that of the salaries paid to Inspectors, the sum of \$341.79 was paid as a balance due to Inspectors at the time the present Commissioner came into his office—Sept. 23, 1879—and the sum of \$500.00 was paid to Prof. W. J. Land, Chemist of the Department, as balance due him to the date of his resignation; making, in all, \$841.79. The present Inspectors received their appointments and their salaries commenced on 15th of October, 1879; and the Chemist on the 12th of November, 1879.

The Inspectors have performed their duties faithfully and the protection to the farmers has been as complete as is practicable under the law, which is defective in some respects. Much difficulty has been experienced in administering the law on account of its ambiguity and the impracticability of executing some of its requirements strictly according to its letter. An entire revision of all the laws relating to the inspection and analysis of commercial fertilizers is therefore recommended.

DISTRIBUTION OF SEEDS.

Believing that much good can be accomplished by a judicious distribution of seeds, of approved varieties, among the farmers of the State, diligent inquiry has been made for the best varieties, and these purchased in such quantities as was deemed necessary to introduce them into the different sections of the State. The distribution has been made principally through the local Agricultural Clubs and Societies and the correspondents of the Department, but generally to any citizen who desired to test them. A record of all to whom seed were distributed has been kept in this office, and a summary of the results of the various tests will be published for general information when reports are received. The following seeds have been distributed in the quantities and at the cost named in the following statement:

SEEDS DISTRIBUTED.

	Quantity.	Cost.
<i>Tobacco Seed—</i>		
Orinoco	2 lbs.	
Havana	4 lbs.— 6 lbs.	\$5 25
<i>Cabbage—</i>		
Georgia Collards.....	1 $\frac{3}{4}$ lbs.	
Buncombe Cabbage.....	5 lbs.— 6 $\frac{1}{2}$ lbs.	22 30
<i>Oats—</i>		
Burt.....	10 bus.	15 00
<i>Wheat</i>		
Dallas.....	100 bus.	250 00
<i>Corn—</i>		
Newman Prolific	10 bus.	
Hudson.....	2 bus.-- 12 bus.	12 00
<i>Cotton Seed</i>		
Herlong.....	20 bus.	
Rameses	4 bus.	
Jones' Improved.....	10 bus.	
Jones' Long Staple Upland.....	10 bus.	
Petit Gulf.....	30 bus.— 74 bus.	172 30
<i>Medick—</i>		
Spotted Medick.....	20 bus.	20 00
		<hr/> \$496 85

The reports thus far received indicate very general satisfaction with the results of the tests.

The distribution will be continued and confined mainly to the dissemination of varieties of approved excellence which are so far confined to limited localities in this or other States. But little will be done in the way of introducing seeds of experimental crops. The distribution will be confined principally to improved varieties of the crops already cultivated in the State. Considerable impetus has been given within the last few years to the cultivation of upland rice in the interior of the State. Arrangements are now being perfected for the distribution of seed-rice to those who wish to experiment with it in interior counties.

EXPERIMENTAL STATION OR FARM.

Much good could be accomplished for the agriculture of the State and much expense saved to individual farmers, by the establishment of an experimental station or farm for the conduct of experiments under scientific observation. On such a farm seeds of various kinds could be subjected to comparative experimental tests, different methods of cultivation compared, the effects of different fertilizers and combinations of fertilizing elements experimented with, the different breeds of stock reared and compared as to their relative profit for different purposes, improved implements tested, and accurate and reliable information secured for dissemination among the farmers of the State. Individuals engaged in agriculture are rarely possessed of a combination of wealth with practical and scientific knowledge, together with public spirit sufficient to conduct the various experiments necessary to the acquirement of accurate information, such as is needed in the present age of progress in Agriculture. Even if individuals conduct experiments, the results are rarely given to the public and hence others find it necessary, for their

own information, to go over the same ground, thus involving time and expense in each locality to accomplish what a State station or farm could do for the whole people. Such stations have long been established in Germany, France and some of the northern United States, whose superior advancement in agriculture is largely due to the results of their labor.

Our circumstances of soil, climate and productions are so different from those of Europe and the Northern States that, with the exception of the general principles established by the results of their investigations, they avail us but little.

Southern agriculture has ever been retarded by an effort on the part of farmers to imitate Northern and European practice. The most of our agricultural literature has emanated either from the North or from Europe, where the diversity of soil, climate and productions render their teachings inapplicable to the South. The scientific and practical experiments conducted for the last 20 years by J. B. Lawes, of England, while of incalculable value to the agriculturist of that Kingdom, would only mislead Southern agriculturists, should they attempt to put into practice the deductions derived from them. The same is true, with some modifications, of the results of the experimental stations on the continent of Europe and those of the northern United States. We need such a farm, conducted under systematic, scientific observation, from which results may be published to the people of the State with the sanction of official authority. The means for the establishment and maintenance of such a station are already at hand, furnished by the farmers themselves in the surplus derived from the fees paid for the inspection of fertilizers. The accumulated surplus, which has been paid into the Treasury from this source within the past three years, has aggregated \$101,591.50, that from the past season,

1879-80, alone, amounting to \$49,438.36. As this tax was not imposed for revenue purposes, but merely for the protection of consumers of commercial fertilizers, and since, according to the accepted principles of political economy, the inspection fees are paid by the consumer—the farmers of the State—there is no reason why they should be required to contribute, annually, this surplus, as a class, to the general fund of the State. It is therefore recommended that the surplus fund arising from the inspection of fertilizers be devoted to the purchase, equipment and conduct of one or more experimental stations in the State, under such provisions and restrictions as the General Assembly may in its wisdom enact. Such an appropriation of this fund would not only be just to those who pay it, but contribute to the advancement of all productive industries of the State, and by its results, not only increase production, but would lead to an enhancement of real estate, which will result in an increased revenue from that source.

Georgia is and must, for many years to come, be essentially an agricultural State. It is wise statesmanship, therefore, to foster by all legitimate means this fundamental source of our wealth. So dependent are all other industries, as well as the professions, upon a prosperous agriculture that every citizen of Georgia, whatever be his calling, is vitally interested in all measures looking to its advancement. Such a station or stations, as are here recommended, would prove valuable auxiliaries, not only to those now engaged in agriculture, but to the various schools and colleges established for the instruction of our youth preparatory to embarking in that industry. It would tend to stimulate a spirit of inquiry, and practical and scientific investigation on the part of individual farmers which could but lead to an advancement in knowledge and a material increase in productions. This is essentially an age of progress, in which Georgia should not be a laggard; to stand still is to be left behind.

PUBLICATIONS.

The following publications have been issued from the Department since October 1st, 1879:

No. Circular.	Subject-Matter.	Pages.	Copies.
Cir. No. 1.	September Crop Report, 1879.....	14	16,000
" " 2.	Rules and Regulations for the Inspection of Fertilizers, 1879-80.....	4	1,000
" " 3.	Soil Tests, Report of 1879.....	94	5,000
" " 4.	Supplementary Report, 1879.....	30	16,000
" " 5.	Analyses and Value of Commercial Fertilizers, five editions.....	4	11,000
" " 6.	April Crop Report, 1880.....	16	16,000
" " 7.	May " " "	16	16,000
" " 8.	June " " "	16	16,000
" " 9.	Analysis and Statistics of Commercial Fertilizers, 1879-80.....	16	17,000
" " 10.	July Crop Report, 1880.....	16	17,000
" " 11.	August Crop Report, 1880.....	16	17,000
		242	148,000

MANUAL ON CATTLE.

A "Manual on Cattle," adapted to the use of the farmers in Georgia, is now in press. This will make a volume of about 150 pages, fully illustrated with representations of the different breeds reared in the United States, and such other illustrations as were deemed necessary to elucidate the subject in hand, together with a chapter on grasses and forage plants adapted to our soil and climate. It is believed this work will supply, in a condensed form, information needed by every family that keeps even a single cow, and result in a decided improvement in the attention bestowed on neat cattle in the State, as well as in the character of the stock kept.

SOIL TEST OF FERTILIZERS.


Samples of sixty-seven brands of commercial fertilizers were distributed to farmers in every section of the State last spring for soil tests. The following instructions were furnished each person to whom these samples were sent:—

DIRECTIONS FOR CONDUCTING THE SOIL TESTS OF
FERTILIZERS FOR THE YEAR 1880.

DEAR SIR: You will please comply, as far as practicable, with the following "Directions" in conducting the soil test of fertilizers sent you from this Department. Without the utmost care and accuracy in all observations, and in every detail of the work, from the preparation of the soil to the gathering of the crops, experiments are valueless.

Agricultural experiments are nothing more nor less than questions asked of Nature. If a question is not accurately and clearly asked, the interpretation of the answer will be difficult, if not impossible.

Experimenters are therefore urged to give their personal supervision to every detail connected with the soil-tests of commercial fertilizers received from the Department in order that they may possess, when the crop is gathered, all the data necessary to give a full and accurate report, not only of results, but of every essential circumstance connected with the experiment.

 *Reports are expected, whether the experiment results in success or failure.*

1. Select a plat of land as nearly uniform in character and fertility as possible.

2. If the test is to be made with corn, cotton, or any crop planted in *rows*, apply each fertilizer to four consecutive rows, 35 or 70 yards long, leaving four rows unfertilized between those fertilized with different brands, thus: A, four rows, without fertilizer, four rows; B, four rows, without fertilizer, four; C, four, etc., through the plat. When the crop matures, gather the *two middle* rows of each four—fertilized and unfertilized, and weigh and record the same accurately. If it is cotton, weigh and record carefully each separate picking, and the date of each. If the test is made with small grain, or any crop sown broadcast, lay off plats 35 or 70 yards long and 6 feet wide,

with a vacant space one or two feet wide between the plats, and apply the fertilizer to each alternate plat; and when the crop is gathered, record separately the product of the fertilized and unfertilized plats. In all small-grain tests give the weight of the grain, and of the straw after the grain is threshed out.

3. In these experiments, use each fertilizer or compost at the rate of 200 or 100 pounds per acre, regardless of cost, on cotton or corn; 200 pounds broadcast on small grain.

4. In conducting these tests be careful to have the quality of the soil the *preparation, planting, stand and cultivation, identical on each four rows, the only difference being in the kind or quality of fertilizer used. Without this, the test will not be reliable.*

5. *If compost is used, state the formula adopted in composting, giving the quantity and character of each ingredient, and the method employed in composting.*

6. If convenient, purchase on the market some of the same brands as those submitted for test, and report the result as directed in No. 2 above.

7. Use on the same plat any other brand which you may have.

8. Use a portion of the samples submitted for test, in contrast with any others you may have, on any other crop on your farm or garden, and report result.

9. When Acid Phosphate or Dissolved Bone,—*not ammoniated*—is tested, compost it by formulæ for composting, given in the circulars of this Department.

10. Conduct any other test in any manner you may prefer, and report results and facts as above requested.

11. Make a careful and accurate record of everything as it is done, or as it takes place. Let your record also contain the following, viz:

a. The character of the soil and sub-soil in which the

test is made, whether sandy, clayey, marley or calcareous, and whether upland or bottom, how long in cultivation, and the character of the original growth.

b. Its previous treatment, both as to crops cultivated and fertilizers used for several previous years, and, if practicable, select a plat which was not fertilized in 1879.

c. The time and manner of preparation, time and manner of planting, modes of cultivation, seasons, both as to temperature and rainfall, and any other fact of interest connected with the test of fertilizers.

12. When the crop is gathered, make a full report to the Department, embracing everything laid down in the foregoing, or that is connected with the experiment. Blanks, on which to make out this report from the record made by you during the year, will be sent to you in November next.

These experiments, to be valuable, should be conducted with great care, and the results accurately reported by the first day of December next, or as soon thereafter as the results can be ascertained.

The results of these experiments, when reported will be published and distributed to the farmers of the State. The samples for these experiments were taken by the Inspectors from the packages offered for market and shipped by them as directed by the Commissioner to the various experimenters, carefully selected throughout the State. These experiments, while as accurate as could be expected, when conducted on the farm, do not carry with them the authority which would accompany similar tests conducted at a State experimental station. The thanks of the Commissioner of Agriculture and of the farmers of the State are due these gentlemen for their voluntary assistance rendered in the careful conduct of these tests.

REPORT OF THE SUPERINTENDENT OF FISHERIES OF
GEORGIA.

Hon J. T. Henderson, Commissioner of Agriculture :

I beg leave to make the following report for the year just closed :

With the limited appropriation placed at the disposal of the Department, it has been an exceedingly grave question to determine how to conduct the work so as to best subserve the purposes for which it was intended. In making a careful study of the geographical arrangement of the streams of Georgia, it becomes obvious that no State in the Union is so well adapted as this for the cultivation of anadromous (migratory) food fishes.

Beginning at the Savannah river, which, fortunately, is under the exclusive control of Georgia, and extending westward, across the State, we meet, in turn, the Ogeechee, the Oconee and the Ocmulgee, the last two uniting and forming the Altamaha a few miles from the Atlantic Ocean, and all these emptying into the same ; next, the Flint and Chattahoochee uniting near the extreme limit of the State and forming the Apalachicola, which empties into the Gulf of Mexico. The Chattahoochee, from West Point down, so far as Alabama is concerned, forms the western boundary of Georgia, and, like the Savannah, is exclusively under the control of this State. Near West Point, this river ceases to be the boundary of this State, but having its headwaters in the extreme northeast part of the State, among the mountains of that region, where it can almost shake hands with the headwaters of the Savannah, it passes diagonally across the State nearly parallel with the Air-Line and Atlanta and West Point Railroads, being but a few miles from Gainesville and Newnan, and six or seven miles from Atlanta. The Etowah and Oostanaula with their confluence at the city of Rome, by their numerous ramifications, liberally

supply Northwest Georgia. At Rome, they form the Coosa, which empties into the Alabama, which flows finally into the Gulf of Mexico. These rivers being so uniformly distributed over the State, and our system of railroads generally crossing them, would make the distribution of fish from the rivers very easy. To illustrate: A line drawn from Augusta, by Macon, to Columbus, would pass through sixteen counties, every one, with a single exception, touching a railroad.

SHAD.

In former times the shad passed freely up all the rivers emptying into the Atlantic Ocean to find their spawning grounds. Why they did not pass up the rivers emptying into the Gulf of Mexico, has no explanation, but numerous experiments, which it is not necessary to mention here, have demonstrated the fact beyond a cavil, that they will just as freely pass up the rivers emptying into the Gulf. The genuine white shad of the Atlantic have been taken from the rivers at Rome and Columbus, Ga., and from numerous streams emptying into the Gulf in other States, and in each and every one of these cases the result is clearly traceable to artificial hatching. In view of all these facts, and many others that could be mentioned, it was determined to commence the work of re-stocking our barren rivers with the shad. The habits of this fish render it peculiarly adapted to this purpose, and it is no longer an open question that barren rivers can be re-stocked with entire success by artificial propagation. There is a fine economical view of this subject. The young shad deposited in the river pass down the stream to the ocean, and in three years return to their spawning grounds to reproduce their species, and the fact seems well established, that during the passage to and from the ocean they draw no supplies from the river, as they eat nothing during the transit, and the run of the

fish lasting many days, an excellent opportunity to capture them for food is thus furnished. It is, too, a fish of great fecundity. A shad, ripe for spawning, will yield at least ten thousand eggs to every pound of its weight. These eggs are hatched with great facility artificially—hatching in fifty-eight hours with the water at a temperature of seventy-five degrees; and best of all, when young shad are hatched, they are measurably able to take care of themselves, and hence, can at once be turned into the stream. It is only by artificial hatching that we can ever again make shad plentiful in our rivers. The most careful estimates which have been made show that not more than one egg deposited in the natural way, out of forty thousand, produces a fish. The eggs are the prey of almost everything that lives in the water, while, by the artificial process, under ordinary circumstances, ninety-eight per cent. will hatch. The young shad, artificially hatched, when turned into the river, are put into deep water, where their natural enemies, the small fish, do not go from fear of the large ones. These diminutive shad do not attract the attention of the larger fish, and hence few are lost. Enormous quantities of shad can be annually hatched and deposited in the streams at very small expense. There has been great difficulty for the past several years in finding the spawning grounds of the shad, owing to the limited number which have been passing up the streams. Seth Green, the great pioneer of fish-culture, wrote me that he visited Georgia a few years ago with a view of artificially hatching shad here, but, unfortunately, could procure no shad for the purpose. In fact, in some of the streams they have become almost extinct, as the result of over-fishing and the obstruction of dams.

In June last my official duties called me to the city of Augusta, where I chanced to meet Col. McDonald, the Commissioner of Fisheries for the State of Virginia, and

Mr. Page, Superintendent of Fisheries of the same State, both experts in artificial fish culture. We visited the dam at the head of the canal, where we found that shad had been taken in large numbers, and it was decided that this would be an excellent place to establish a hatchery, and Mr. Page consented to superintend the work. A few hatching boxes were prepared on the Seth Green plan, and we hoped that a few million of shad might be hatched before the run was over, but before we could get everything in readiness the fish had ceased to run. Our material, however, is on hand for future work. The expense incurred was light—only \$12.50. This is a most excellent place for a hatchery and will doubtless be the initial point for future operations. The work of re-stocking our barren rivers has been carried on to the extent of our means. We received from the U. S. Commissioner of Fish and Fisheries over one million of young shad during the month of June last. Three hundred thousand were placed in the Oconee river at the railroad crossing near Gretnesboro', over three hundred thousand were placed in one of the branches of the Ocmulgee at the railroad crossing near Covington, and over four hundred thousand of these fish were placed in the Chattahoochee at the railroad crossing near Iceville. Some of these streams have obstacles to the return of these fish to their spawning grounds, for it is a well known fact that they return unerringly to the river in which they were spawned or deposited. The obstacles alluded to are mill-dams. This difficulty can be overcome by constructing fish-ways, which can be done very cheaply and efficiently. I most respectfully suggest that this matter be brought before the General Assembly.

TEMPERATURE OF THE RIVERS.

In crossing the State for the purpose of planting these fish in the waters of Georgia on the 7th and 8th of June last, the temperature of each and every river was noted and found to be about 80°. The waters are all more or less turbid, but this will not seriously interfere with artificial culture. The Oconee thirty years ago, when teeming with shad, was equally as muddy as at the present time. With our water supply and the appliances within our power, fish can be taken from the list of luxuries and placed within the reach of all. With an appropriation which need not exceed one cent per capita of all the people of Georgia, fish may be made so exceedingly plentiful that a full-sized shad may be bought for ten cents. I most respectfully and urgently ask that such an appropriation may be recommended.

GERMAN CARP.

Much interest is now being manifested in the culture of the German carp, a fish introduced into the United States from Europe in the last few years. This fish, for pond culture, is no doubt the best known. Among its good points may be mentioned great fecundity, rapid growth, living largely on vegetable matter, not predacious in its habits and an excellent food fish. Its fecundity is extraordinary; a fish weighing from 4 to 6 pounds will produce four hundred thousand eggs. In the month of November last, about seven hundred of these young fish, weighing about one-half ounce each, were received from the U. S. Fish Commissioner and distributed to various parties in the State, in small quantities to each. They have done remarkably well so far as heard from, one correspondent reporting by letter received to-day that a fish of this distribution deposited in his pond on the 21st of Nov. last, now weighs four pounds; others report a growth nearly as large. These fish, when well cared for, attain a great

weight, frequently from thirty to fifty pounds. They are usually captured at about four to six pounds as their table qualities are perhaps best at about that size. I have now on file numerous applications for the carp from all parts of the State and am promised a liberal shipment from the U. S. carp ponds at Washington. Circulars giving instructions have been sent to all applicants, and as soon as the shipment is received the distribution will be made. It is very desirable to introduce this fish into the large natural ponds of the State as rapidly as possible, and to meet all wants that may arise I suggest that hatching ponds be established in this State as soon as practicable.

Respectfully submitted,

H. H. CARY,

La Grange, Ga., Oct. 16, 1880.

Superintendent.

Your attention is respectfully invited to the foregoing report of Dr. H. H. Cary, Superintendent of Fisheries, and especially to that portion in which he shows the necessity for a reasonable appropriation to carry on this most important work. At no period in the history of the State have the people manifested so much interest in fish-culture. It is a question of vast economic importance to the people of the State, and one well worthy the consideration of the General Assembly. The present annual appropriation is utterly inadequate to accomplish results commensurate with the importance of the interests involved.

GENERAL OUTLOOK.

Notwithstanding unpropitious seasons in some localities, Georgia has participated in the general prosperity of the agriculture of the country. This is noticeable in the improvements in home comforts and conveniences, the more general introduction of improved implements and machinery on the farm, and in improved methods of culture. The introduction of steam power on the farm to supply the place, as far as practicable, of the more expensive mule

power, is a striking feature in this advancement. Five years ago there were but few gins run by steam engines ; at the rate at which they have been introduced in the past three years, in less than ten years steam power gins will be the rule and mule power the exception.

Another evidence of progress is shown in the demand for improved seeds and the greater care exercised by the farmers in the selection and improvement of farm seeds of every variety.

More attention is being paid to the improvement of stock by the introduction of thoroughbreds. This is particularly noticeable in cattle and sheep. The introduction of thoroughbreds is invariably followed by the bestowal of better attention upon stock. Notwithstanding the continued opprobrium upon sheep husbandry occasioned by the unchecked ravages of dogs, that industry offers so inviting a field for enterprise and profit, that it is receiving acquisitions, especially among young farmers all over the State. The ravages of dogs furnish, at present, the only serious obstacles to successful sheep husbandry in Georgia. The remunerative price at which cotton sold last winter has unfortunately checked the interest which the previous low prices had stimulated in pork production. While this is unfortunate, it is a natural consequence of a paying price for cotton and cheap Western pork.

The dairying interest has received a decided impetus from the introduction of Jersey cattle. Not only have regular dairies been established, but butter production is receiving more and better attention on the farms. The small industries of the farm, the fruit and vegetable garden, the apiary and poultry yard, while receiving more attention than formerly, are still having less than their importance justifies. Fruit culture for market, on a large scale, has been materially stimulated by the work of the Georgia State Horticultural Society, and notwithstanding we have

had two unpropitious fruit seasons, nurserymen find it impossible to supply the demand for trees. The opening of the Cincinnati Southern Railway, affording rapid transportation of perishable products to Western cities is exerting a wholesome influence on fruit and vegetable production.

AGRICULTURAL ORGANIZATIONS.

One of the encouraging signs of the times is found in the increasing numbers and greater activity of local agricultural organizations. The success of local fairs in different parts of the State and the greater disposition, generally, amongst farmers to avail themselves of all instrumentalities of progress, none of which are more potent than the local and county organizations, is another evidence of improvement amongst the farmers. The State Agricultural Society has been an important factor in the dissemination of information and the consequent advancement of agriculture in the State. It is the only State society in the United States which is organized on a representative plan. The delegates to its Conventions represent local organizations.

Another evidence of progress is manifested by the increasing interest felt by the farmers of the State in the work of the Department of Agriculture. This is shown by the almost daily inquiries received at this office for improved stock, seeds and implements. Altogether, the agricultural interests of the State seem to be on a healthy basis. The farmers are hopeful, and manifest a determination to make Georgia, in fact, the Empire State of the South.

ACKNOWLEDGEMENTS.

I desire to acknowledge the valuable services rendered by the correspondents of the Department in supplying reliable information in regard to the areas planted in differ-

ent crops in their respective counties, the condition of growing crops, their comparative yield, and other information which has aided the Commissioner in the discharge of his duties. Soil test experimenters are entitled to my thanks and to those of all who use commercial fertilizers, for conducting for the general information of the farmers of the State, careful comparative tests of the different brands of commercial fertilizers. These tests involve the expenditure of much time and labor, which these gentlemen have cheerfully bestowed for the general good.

I take pleasure in acknowledging the valuable service of numerous gentlemen all over the State who have received and distributed in their respective counties, the publications of the Department.

I desire to acknowledge valuable service rendered by the meteorological observers, who have given their time to public work for the general good.

The press of the State, with their characteristic public spirit, have rendered valuable service to this Department and the agricultural interests of the State, by inviting the attention of their readers to the work and publications of the Department.

Valuable assistance has been rendered the Department by the hearty co-operation of the Georgia State Agricultural Society, the Georgia State Horticultural Society and by the local agricultural societies and clubs of the various counties.

To the United States Department of Agriculture, and to the Departments and Boards of Agriculture of other States, I am indebted for many valuable additions to the library of this Department.

To Hon. Spencer F. Baird, United States Fish Commissioner, I am indebted for the shad and carp which have been distributed in the State. He has placed many fish culturists in this State under obligations to him.

To your Excellency I desire to acknowledge, on behalf of the farmers of the State, your promptness in refitting the rooms of the Department, and making them as comfortable as their location in the basement of the capitol will admit.

Very respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

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Very respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

SPECIAL CIRCULAR No. 13, }

NEW SERIES.

QUESTIONS

—FOR—

Supplemental Report of Crops,

SEASONS, LABOR, ETC.,

FOR THE YEAR 1880,

RETURNABLE DECEMBER 15th, 1880.

DEPARTMENT OF AGRICULTURE,

Atlanta, Ga., December 1, 1880.

DEAR SIR:

Please answer the following questions, and return to this office by the 15th of December.

Let the answers apply to the whole County for which you report—not simply to your own neighborhood.

New correspondents are informed that the crop or standard with which comparisons are made is always 100; so, 10 per cent. better, or greater, or more, would be indicated by 110; 10 per cent. less by 90, and so on.

Please answer promptly, so that your reply may reach this office by the 15th of December.

Very respectfully,

J. T. HENDERSON,

Commissioner of Agriculture.

- I. For what county do you report? Co.
- II. Your name,
- III. Your post-office?
- IV. Will you act as correspondent next year?

ESTIMATED YIELD COMPARED TO LAST YEAR OF—	PER CENT.	ACTUAL AVERAGE YIELD PER ACRE IN BUSHEL, POUNDS, GALLONS, ETC.	NO. BUSHEL, GALLONS, ETC., PER ACRE.
1. Corn	Bushels (Shelled Corn).....	.....
2. Cotton.....	Pounds Seed Cotton.....	.....
3. Sugar Cane.....	Gallons of Syrup .....	.....
4. Rice	Bushels (rough).....	.....
5. Wheat.....	Bushels .....	.....
6. Oats.....	Bushels .....	.....
7. Field Peas.....	Bushels (planted with corn).....	.....
8. Sweet Potatoes.....	Bushels .....	.....
9. Sorghum	Gallons of Syrup.....	.....
10. Ground Peas.....	Bushels.....	.....
11. Chufas	Bushels .....	.....
12. Millet	Tons of Dry Forage.....	.....
13. Clover.....	Tons of Cured Hay.....	.....
14. Other Hay (give name).....	Tons of Cured Hay.....	.....
15. Forage Corn.....	Tons of Dry Forage.....	.....
16. Aggregate crop of Cotton in your county in bales..... bales.
17. Aggregate number of bushels of Corn produced in your county this year..... bushels.
18. Aggregate number of barrels of Syrup from Cane..... barrels.
19. Aggregate number of barrels of Syrup from Sorghum..... barrels.
20. Acreage of Wheat compared to last year per cent.
21. Acreage in Fall Oats compared to last year..... per cent.

22. Amount of home-raised Pork produced compared to last year.pounds.
23. Average number of bales of Cotton (of 450 lbs. each)
made in your county this year for each plow run.....bales.
24. Are farmers generally in better or worse condition than last year.....
25. What is the indebtedness of farmers compared to last year.....per cent.
26. What per cent. of a full supply of provisions for 1881
have been produced in your county this yearper cent.
27. Have farmers in your county purchased more,
or less, farm supplies this year than last.
- If more, what per cent.per cent.
- If less, what per cent.....per cent.
28. What has been the average *cash* price per pound
of Bacon in your county this year.....cents.
29. What for Corn per bushelcents.
30. What has been the average *time* price per pound of Bacon payable Nov. 1stcents.
31. Time price for Corn per bushelcents.
32. Have farm hands advanced in price since last December.....
33. If so, what per cent.....per cent.
34. Report any facts of interest to the farmers of Georgia.....

CIRCULAR No. 14.
(New Series.)

Results of Soil Tests

—OF—

COMMERCIAL FERTILIZERS

And Seeds

FOR THE YEAR 1880.

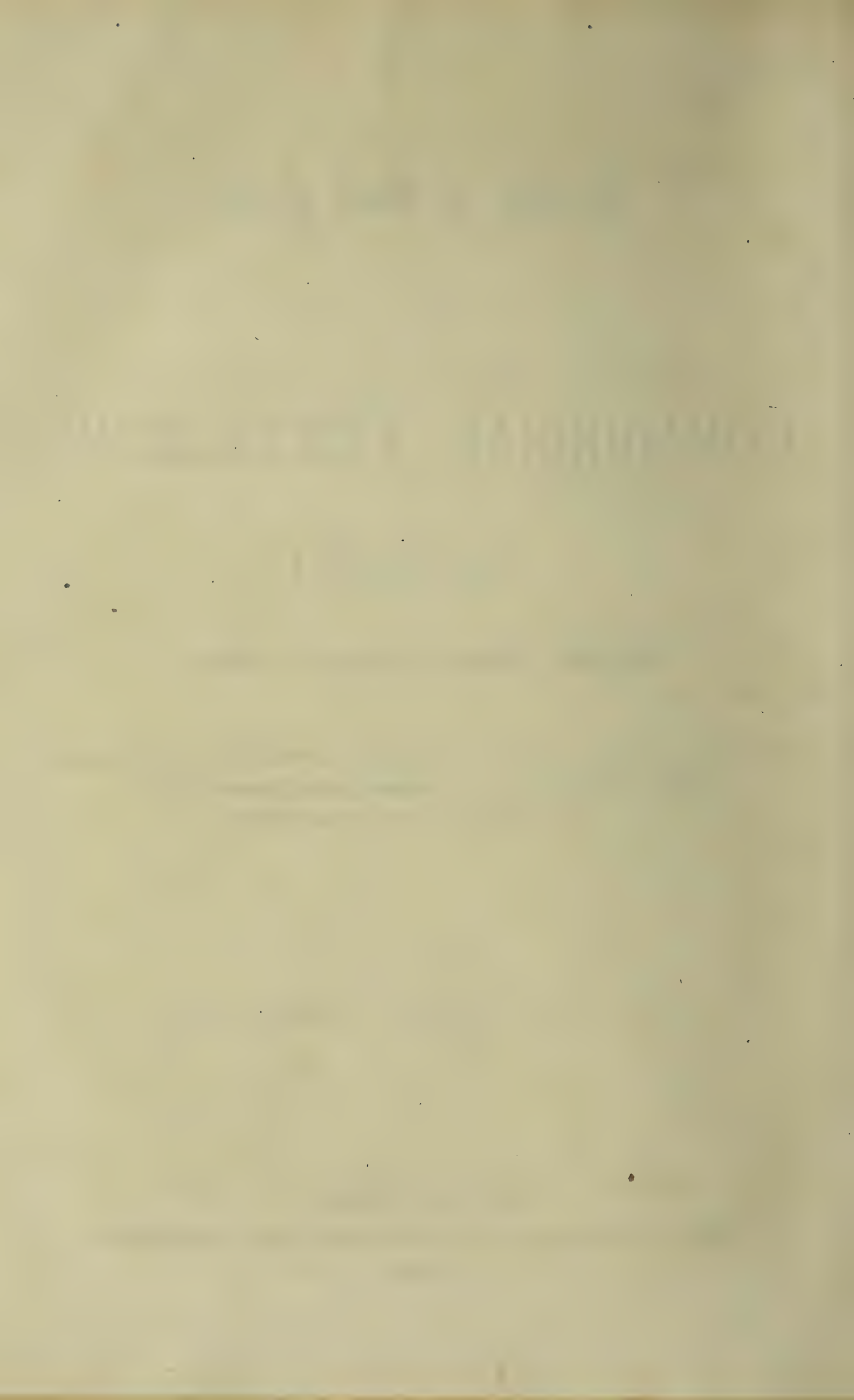
CONDUCTED UNDER THE DIRECTION OF THE COMMISSIONER OF AGRICULTURE OF THE STATE OF GEORGIA, WITH COMMENTS ON THE RESULTS OF THE EXPERIMENTS.

J. T. HENDERSON, COMMISSIONER.

ATLANTA, GEORGIA :

JAMES P. HARRISON & CO., PRINTERS AND PUBLISHERS.

1880,



Soil-Test of Fertilizers for 1880.

DIRECTIONS FOR CONDUCTING THE SOIL-TEST OF FERTILIZERS FOR THE YEAR 1880.


The following circular, bearing date of February 2, 1880, was sent to each experimenter as a guide in conducting the soil tests :

DEAR SIR :

You will please comply, as far as practicable, with the following "directions" in conducting the soil test of fertilizers sent you from this Department. Without the utmost care and accuracy in all observations, and in every detail of the work, from the preparation of the soil to the gathering of the crops, experiments are valueless.

Agricultural experiments are nothing more nor less than questions asked of Nature. If a question is not accurately and clearly asked, the interpretation of the answer will be difficult if not impossible.

Experimenters are therefore urged to give their personal supervision to every detail connected with the soil tests of commercial fertilizers received from the Department, in order that they may possess, when the crop is gathered, all the data necessary to give a full and accurate report, not only of results, but of every essential circumstance connected with the experiment.

 Reports are expected, whether the experiment results in success or failure.

1. Select a plat of land as nearly uniform in character and fertility as possible.
2. If the test is to be made with corn, cotton, or any crop planted in rows, apply each fertilizer to four consecutive rows, 35 or 70 yards long, leaving four rows unfertilized between those fertilized with different brands, thus : A, four rows, without fertilizer four rows ; B, four rows, without fertilizer four ; C, four, etc., through the plat. When the crop matures, gather the *two middle rows* of each four—fertilized and unfertilized—and weigh and record the same accurately. If it is cotton, weigh and record carefully each separate picking and the date of each. If the test is made with small grain, or any crop sown broad-cast, lay off plats 35 or 70 yards long and 6 feet wide, with a vacant space one or two feet wide between the plats, and apply the fertilizer to each alternate plat ; and when the crop is gathered, record separately the product of the fertilized and unfertilized plats. In all small-grain tests give the weight of the grain, and of the straw after the grain is threshed out.
3. In these experiments, use each fertilizer or compost at the rate of 200 or 100 pounds per acre, regardless of cost, on cotton or corn ; 200 pounds broad-cast on small grain.

4. In conducting these tests, be careful to have the quality of the soil, the preparation, planting, stand and cultivation, identical on each four rows, the only difference being in the kind or quality of fertilizer used. Without this the test will not be reliable.

5. If compost is used, state the formula adopted in composting, giving the quantity and character of each ingredient, and the method employed in composting.

6. If convenient, purchase on the market some of the same brands as those submitted for test, and report the result as directed in No. 2 above.

7. Use on the same plat any other brand which you may have.

8. Use a portion of the sample submitted for test, in contrast with any others you may have, on any other crop on your farm or garden, and report result.

9. When Acid Phosphate or Dissolved Bone—not ammoniated—is tested, compost it by formula for composting given in the Circulars of this Department.

10. Conduct any other test in any manner you may prefer, and report results and facts as above requested.

11. Make a careful and accurate record of everything as it is done, or as it takes place. Let your record also contain the following, viz:

a. The character of the soil and sub-soil in which the test is made, whether sandy, clayey, marley or calcareous, and whether upland or bottom, how long in cultivation, and the character of the original growth.

b. Its previous treatment, both as to crops cultivated and fertilizers used for several previous years, and, if practicable, select a plat which was not fertilized in 1879.

c. The time and manner of preparation, time and manner of planting, modes of cultivation, seasons, both as to temperature and rainfall, and any other fact of interest connected with the test of fertilizers.

12. When the crop is gathered, make a full report to the Department, embracing everything laid down in the foregoing, or that is connected with the experiment. Blanks on which to make out this report from the record made by you during the year, will be sent to you in November next.

These experiments, to be valuable, should be conducted with great care, and the results accurately reported by the first day of December next, or as soon thereafter as the results can be ascertained.

RESULTS OF SOIL-TESTS FOR 1880.

Note.—In the following pages, those fertilizers marked “a” were furnished by the Department of Agriculture, from samples taken by the Inspectors when they inspected the brands so marked. All not so marked were furnished by the experimenters themselves.

EXPERIMENT OF PROF. M. A. McNULTY, PRESIDENT OF THE GRANGE COLLEGE, CUTHBERT, GA.

Mr. McNulty received from the Department, samples of Gossypium Phospho, Vulcanite Guano, No. 2, for cotton, and Mastodon Ammoniated Soluble Phosphate.

Character of Soil—Light sandy, eight years in cultivation; original growth, oak and pine.

Previous treatment—It has been cultivated alternately in corn and cotton since 1872. Previous to this year it has been lightly manured with a compost of stable manure and cotton seed, and a marl obtained from Randolph and adjoining counties.

Preparation of the Soil—March 15th it was plowed east and west with a six-inch turning plow. The plat was 140 yards square, and nearly level. April 1st the rows were bedded $3\frac{1}{2}$ feet apart, running north and south.

Fertilizers were applied at the rate of 200 pounds per acre, when the cotton was planted.

Time and Manner of Planting—April 12th and 13th, planted in rows $3\frac{1}{2}$ ft. apart; opened beds with common scooter; in this furrow applied the fertilizers at the rate of 200 pounds per acre, sowed the cotton seed in the same furrow, and covered with a board.

Cultivation—Sided the cotton May 10th, and chopped out May 11th; plowed it May 12th and 28th, and on the 29th brought it to a stand and plowed thoroughly; June 14th, hoed and swept, and July 13th laid it by with a sweep.

Seasons were very favorable for the growth of cotton, except during July, from the 10th to 25th, when the crop suffered much from drouth, yet the temperature went very rarely above 92° in the shade.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied pr Acre.	1st Picking	2d Picking	3d Picking	4th Picking	Yield in Seed Cotton per Acre.
		Aug.	Sept.	Oct.	Nov.	
<i>α</i> Gossypium Phospho.....	200	85	104	213	152	554
<i>α</i> Vulcanite Guano No. 2.....	200	49	233	256	201	709
<i>α</i> Mastodon Ammo'd and Super-phos...	200	93	251	168	43	555
Cumberland Super-phos. of Lime.....	200	101	209	151	54	515
Av'ge on intervening unmanured rows..	00	00	92	59	156	307

Professor McNulty says: "I am convinced that guano in larger quantity than 100 pounds per acre will not pay, especially on old land. I applied the same grades of fertilizers at the rate of 100 pounds per acre, and could see no material difference in the growth or yield of the cotton on which I applied 200 pounds per acre. I am very well satisfied that composting with phosphates at the rate of 400 or 500 pounds per ton, is, beyond a doubt, the best way to apply fertilizers, and that the best grades in the market should be used. The so-called Acid Phosphates for composting are only gaudy traps.

"You can see from my tabular statement that the Vulcanite, wherever made, suits my land best used straight, but in compost did not seem any better than the rest. I did not experiment for the Department this year in composting, only on our own instruction. Hereafter, should the Department favor me with means for soil test, I shall use the compost plan, as I am convinced of its superiority for the old lands in our section."

Remarks.—Professor McNulty's conclusions in reference to acid phosphate for composting do not agree either with the results attained by a large number of practical farmers in every part of the State, or with their conclusions in regard to its value for that purpose. His conclusions are probably drawn from too limited observation.

EXPERIMENT OF MR. R. W. EVERETT, ROCKMART, POLK COUNTY, GEORGIA.

Mr. Everett received from the Department samples of Albemarle Guano, Hope Guano and Sterne's Amoniated Bone Super-phosphate.

Soil.—Gray and gravelly, and naturally thin and cold, damp nature—subsoil of a yellowish cast, and *very hard*. Had been a peach orchard for thirty-five or forty years. Original growth, oak and hickory, with an occasional pine.

Previous treatment.—Was sown in clover in 1873, turned in in the fall of 1876 and planted in cotton—has been alternated in cotton and wheat every year since, cotton fertilized with Soluble Pacific Guano—no fertilizer applied to the wheat.

Preparation.—"The plat contains eight acres. In August, 1879, every tree and grub was taken up by the roots. The patch, which had on it a very heavy wheat stubble, having yielded about thirty bushels wheat per acre, was turned 1st September with two horse Watt plow, followed in same furrow by two horse subsoiler of my own make. It was not touched afterwards until 11th of April 1880, when it was thoroughly pulverized with a 'homespun' double V two horse harrow." April 17th, laid off (with 16 inch scooter and 8 inch scrape) the rows three feet apart, distributed the fertilizers and covered them with two furrows with a one horse Watt plow. April 21st, split out the middles with scooter and 18 inch scrape, one furrow to the row.

Time and Manner of Planting.—"Wanted to plant 15th of April, but could not do so until 3d of May. Undertook to plant with Woodward's cotton planter, and made the worst mistake of my agricultural experience. Lost good deal of time trying to make the machine work, and on the 15th of May, when it was too late to replant, found that my labor had been rewarded with a most miserable "stand." For my kind of land the machine is worthless."

Cultivation.—May 20th, sided with double tooth harrow, the ground being hard and dry, and stand poor. May 24th, chopped to a stand. June 15th, hoed; 16th, sided with scooter and 8 inch scrape. June 28th, sided with scooter and 8 inch scrape. July 23d, hoed. July 24th, laid by with three furrows, using scooter and scrape.

Seasons.—May 21st, good rain—much needed; 24th, light shower; 30th, good rain. June 26th, good shower. July 14th, good rain; 22d, good rain. August 3d and 4th, good rain. October 18th, first frost; 24th, killing frost. Late fall, remarkably favorable for the opening of the crop.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertili- zer ap- plied pr Acre.	1st Picking		2d Picking		3d Picking		4th Picking		Yield in Seed Cotton per Acre.
		Sept. 6.		Sept. 23		Oct. 12.		Nov. 1.		
		lbs.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.			
αAlbemarle Guano.....	200	1	10	5	12	7	4	5	6	1400
Nothing.....		1	12	5	6	5	2	3	10	1111
Baker's Standard Am'd Super-phos.....	200	3	4	5	10	8	2	4	2	1473
Nothing.....		0	14	3	12	4	4	3	6	847
αHope Guano.....	200	3	4	5	12	7	0	4	4	1417
Nothing.....		1	0	5	6	4	2	3	10	988
Merryman's Amoniated Dis'd Bone....	200	3	4	5	8	8	0	4	4	1496
Nothing.....			12	3	4	5	4	3	10	901
Soluble Pacific Guano.....	200	2	12	6	8	8	12	4	6	1566
Nothing.....		2	0	6	4	4	6	3	4	1111
Pamlico Guano.....	200	3	4	7	2	9	0	4	6	1662
Nothing.....		0	12	4	8	4	2	3	6	892
Rigdsale's Ammoniated Dissolved Bone	200	3	4	8	6	7	8	4	6	1645
Nothing.....		1	10	6	4	6	6	2	8	1172
αSterne's Am'd Dis. Bone Super-phos..	200	4	10	8	0	8	0	3	12	1706

Mr. Everett says: "The arrangement of my plat was as follows: near the centre of the eight acre field I selected a spot of as uniform fertility as possible, (judging from the appearance of the soil.) There were in the patch sixty-four rows, each thirty-five yards long. The first four were fertilized, the next four not—each alternate four throughout being not fertilized. The fertilizers were weighed on the spot by myself, and distributed by myself, and I know it was correctly done. In picking, the two middle rows of each 'set of four' were picked and weighed separately. As I did both the picking and weighing, I vouch for its accuracy."

But Mark the Sequel:—"There is a greater discrepancy in the yield of the unfertilized than in the fertilized rows. 'This ought not so to be,' but nevertheless the facts exist, and facts, we are told, 'are stubborn things.' Now the conclusion that I arrive at, after a year's close attention, is this: My experiment proved *one* thing, at least, to-wit: My plat was *not* of uniform fertility, nor do I believe that on my whole place can be found half an acre that is *uniform*. 'This conviction is riveted on my mind as the result of several years' experience in "soil tests." I do not wish to do injustice to any manufacturer, nor mislead any tiller of the soil but I greatly fear that this report may do both. I can safely say this much, however: I have never used any brand of fertilizer that did not pay *handsomely*. My success I think attributable partly to *always* using it on *stubble*. About the 15th of February, each year, I compost my stable manure and cotton seed, using equal quantities of each in alternate layers. I apply this compost (no commercial ingredient) to my cotton just as I do guano, only using much more per acre. I make this go as far as it will, and then finish out with some brand or brands of commercial manure—never plant any cotton without manuring it. My compost makes as good (or better) yield the first year as any guano, and certainly pays better the second year than any guano I ever tried."

Remarks.—Mr. Everett's experiment is an interesting one, and attention is specially invited to his remarks about using fertilizers on stubble land well supplied with vegetable matter. His plat illustrates the importance of alternate plats of unmanured rows to detect any want of uniformity in the fertility of the soil. With these plats no one need be misled and no injustice is done to manufacturers.

EXPERIMENT OF MR. G. A. McDANIEL, VICTORY, CARROLL COUNTY, GEORGIA.

Mr. McDaniel received samples of Monarch Guano and Dixie Phosphate, the latter too late for use in the experiment.

Soil.—Fair, gray upland, has been in cultivation about nine years. The original growth was pine, mixed with oak, hickory, chestnut, etc.

Previous treatment.—It was in wheat in 1877, planted in corn in 1878, and slightly fertilized with compost in the drill. In 1879 it was in wheat with 15 to 20 bushels of cotton seed applied per acre—produced about 8 bushels per acre.

Preparation.—The land was first broken up in the winter, with a common one horse turn-plow. A level plat near the middle of the field was selected and laid off in rows three feet wide and thirty-five yards long. Plat arranged as directed, in alternate sets of four rows.

Fertilizers were applied in the opening furrows at the rate of 200 pounds per acre on part of the plat, and 100 pounds per acre on the balance. All was applied on the 6th of April and bedded upon with small turn-plow.

Time and Manner of Planting—The cotton was planted on the 16th of April, with a Dow Law planter, seed all rolled in guano.

Cultivation.—The cotton was harrowed on the 8th of May, with a one-horse iron-tooth harrow. May 12th it was run over with a small double plow, "a plow running on either side of the row." May 14th, chopped out. May 17th, sided with small scooter and scrape. June 3d, sided with same plow; June 10th, hoed; 25th, plowed. Plowed out the middles July 6th.

Seasons.—It rained 29th of April, 3d of May, 21st of May, June 1st and 15th, then rains regularly to August 15th; then a short drouth caused the top crop to shed.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st Picking		2d Picking		3d Picking		Yield in Seed Cotton per Acre.
		Sept. 15.		Oct. 11.		Nov. 10.		
		lbs.	oz.	lbs.	oz.	lbs.	oz.	
Chesapeake Guano.....	200	10		7	8	1	8	1330
No fertilizer.....		3	8	8		1	8	910
Chesapeake Guano.....	100	8	8	6		1	8	1120
No fertilizer.....		2		7	8	2	4	857½
Sea Island Guano.....	200	8		6	4	3		1207½
No fertilizer.....		2		5	8	2		665
Sea Island Guano.....	100	7		4	4	1		857½
No fertilizer.....		2	8	5	8	3		770
Colgate Manure.....	200	8		6	4	1		1067½
No fertilizer.....		3	8	8		1		857½
Colgate Manure.....	100	6		5		2		970
Zell's Am'd Bone Phosphate.....	200	9	12	7		1		1242½
No fertilizer.....		5		8		1	8	1015
Zell's A'm Bone Phosphate.....	100	7	8	6		2		1085
No fertilizer.....		3	12	7	4	2		910
Monarch Guano.....	200	11		6		1	8	1295
No fertilizer.....		5		5		1	4	787½
Monarch Guano.....	100	7		5		1		910
No fertilizer.....		3	8	7		1		805
Stable Manure.....	2000	9		7	8	1		1225

The Dixie Phosphate was received too late for use in the plat, but was used on freshly cleared new ground as follows: The Dixie Phosphate was applied to a portion of the land, a few rows left unfertilized, and then Zell's Ammoniated Bone Phosphate on the rest. The Dixie and Zell made each about 800 pounds seed cotton per acre, and the natural soil about 300 pounds.

Mr. McDaniel says: "The average clear profits on guano used by me this year was about five dollars per acre. Good stable manure, kept dry and well pulverized, one ton per acre, increased the crop \$10.00. After allowing \$5.00 for the ton of manure, there was a net profit of \$5.00 per acre. From several years' experience, I am satisfied that if farmers would build sheds and protect their home-raised fertilizers, and spend the rainy days in saving and preparing it, they could curtail their guano bills one-half. If, however, they cannot raise enough, they do well to use guano on sedge and stubble lands, and especially on new ground. As good cotton as I raised this year was produced on new ground manured partly with stable manure and partly with guano."

EXPERIMENT OF MR. ROBERT BURTON, ELLAVILLE, SCHLEY COUNTY.

Mr. Burton received from the Department samples of Russell Coe's Ammoniated Bone Superphosphate, Cumberland Superphosphate of Lime, and Eureka Ammoniated Bone Superphosphate.

Soil.—Sandy, with stiff clay subsoil; has been in cultivation fifty years. Original growth, oak, hickory and long-leaf pine.

Previous treatment.—It was cultivated in corn and peas in 1879, the corn fertilized with cotton seed. The plat has been cultivated alternately in corn and cotton for the last forty years. Commercial fertilizers were used some years on the cotton.

Preparation.—The land was broken deeply in January. April 1st, laid off rows seventy yards long and three feet wide with shovel plow, bedded with turn plow, and finished the middles with shovel.

Fertilizers were distributed by hand in the shovel furrow 1st of April, applying 5½ pounds to every two rows, which was as near 200 pounds per acre as it could be gotten. Compost made from South Carolina Phosphate was used.

Planted April 12th through a trumpet, the seed rolled in good ashes.

Cultivation.—Barred with turn plow May 12th. Chopped out (stand good) May 17th. Hoed and thinned to a stand June 7th. Split the middles with shovel and scrape June 15th. Plowed with shovel and scrape July 6th, hoes following the plows. July 23d, ran one furrow in the middles with shovel and scrape.

Seasons.—There was rain May 2d, 3d, 4th, 7th, 9th, 11th and 21st; June 25th, the only one in the month. In July, the 5th, 16th, 21st, 25th, 26th and 27th. Rains were very heavy in August, causing rust in spots.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st Picking	2d Picking	3d Picking	4th Picking	Yield in Seed Cotton per acre.
		Aug. 3d.	Sept. 6	Sept. 21.	Oct. 11.	
αCumberland Superphosphate.....	200	lbs. oz. 7 8	lbs. oz. 8	lbs. oz. 5	lbs. oz. 3 4	832
Unmanured.....		2 8	8 8	6 8	4	752
αRussel Coe's Am'd Dissolved Bone.	200	6 12	8	4 8	2 8	761
Unmanured.....		2 4	6 6	4	3 8	563
αEureka Am'd Bone Superphos.....	200	7 8	7 8	4 8	1 4	726
Unmanured.....		2	6 8	4 4	2 8	534
Cumberland Sup. Phos. of Lime.....	200	8 8	7	4 4	2	761
Unmanured.....		2 2	6	5	2 8	561
Baldwin's Am'd Superphosphate.....	200	7 4	8	6 4	3 4	866

Mr. Burton says: "On land containing a plenty of vegetable matter, fertilizers pay. On old land, deficient in vegetable matter, a small quantity pays best. Compost always pays on my old land a far greater per cent. than commercial manures.

EXPERIMENT OF MR. B. F. WILDER, ALBANY, DOUGHERTY COUNTY, GEORGIA.

Mr. Wilder received from the Department Georgia Fertilizer and Wando Acid Phosphate. He says: "I received Wando Acid Phosphate too late to use in comparison with other fertilizers, and took in some weed land that was poor and had rested for two years. I planted it about the first of May, putting 200 pounds per acre with the planting seed. I actually think it increased the yield 100 per cent. I failed to note the results on account of hands getting to and picking it before I knew it."

Soil of first plat—dark, sandy land, in cultivation four years; original growth, oak, hickory, and some pine.

Soil of second and third plats—dark, sandy land, in cultivation at least 30 years. The original growth was pine and scrubby oak.

Previous treatment.—Plat No. 1 was in cotton in 1878-9; in corn in 1876-7; has never had any manure applied to it before this year. Nos. 2 and 3 have been in cotton for many years; had from 200 to 300 pounds of cotton seed per acre, applied in the drill, for two years previous to 1880.

Preparation.—After knocking down the old cotton-stalks, opened deep furrows with 7-inch straight shovel plow between the old cotton rows, applied the fertilizers in these furrows, and listed on them with 6-inch turn shovels. The rows were 3 feet wide and 70 yards long.

Fertilizers were applied as follows: First plat, 200 pounds per acre; applied on 23d day of March in fresh land—No. 1. compost, equal quantities of green cotton seed and stable manure, with 300 pounds Etiwan Dissolved Bone per ton, mixed well three weeks previous. No. 2, compost, equal quantity green cotton seed and stable manure, mixed thoroughly. No. 3, green cotton seed, 200 pounds per acre, applied as above. No. 4, Georgia Fertilizer, 200 pounds per acre. Second plat, in old land in above order, and with same fertilizer and same quantity per acre. Third plat, in old land in above order and same fertilizer, but at the rate of 400 pounds per acre.

Time and manner of planting.—April 18th, finished out cotton beds by bursting out old cotton-stalks with straight shovel plows, and planted the same with Daw Law cotton-seed planter, using coverer on the same.

Cultivation.—May 10th, barred off the cotton with straight shovel plow. May 15th, chopped out, bringing it to a stand of from one to three stalks to the hill. May 28th, plowed out with 28 inch sweep. June 14th, hoed and reduced the stand to one and two stalks to the hill. June 21st, plowed with sweeps, throwing some dirt to the cotton. July 15th, plowed with sweeps again. August 10th, ran one sweep furrow in the middles.

Seasons.—The rainfall was favorable to June 1st, after which there was no more rain till July 12th, when there was not a full season, but enough to start the cotton to growing. During August there was too much rain, causing the cotton to shed early in September.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st Picking	2d Picking	3d Picking	4th Picking	5th Picking	Yield in Seed Cotton per Acre.	Yield in Lint Cotton per Acre.
		Aug. 19.	Sept. 1.	Sept. 20.	Oct. 15.	Nov. 8.		
		lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs.	lbs. oz.
1st Plat—New Ground.								
Compost—Cotton Seed, Stable Manure, & Etiwan Dis. Bone	200	3	4	1 8	3 12	2	499	161
Comp.—Cot. Seed, Sta. Manure	200	2 4	5	1 8	3 12	2	508	164
Green Cotton Seed.....	200	2	4	1 8	2	2 8	420	135½
aGeorgia Fertilizer.....	200	4 8	5	8 3	12 3	3	587	189½
Unmanured.....		2	3 4	1 12	3	2 4	426	135½
2d Plat—Old Land.								
Compost—Cotton Seed, Stable Manure & Etiwan Dis. Bone	200	8	2	2	3 8	2	350	113
Comp.—Cot. Seed, Sta. Manure	200	8 3	8 2	12 3	12 2		438	141¼
Cotton Seed.....	200	8 2	8 2	2 4	3 4	1 8	464	149½
aGeorgia Fertilizer.....	2.0	8 6	2	1 12		4	468	151
Unmanured.....		8 2	8 2	4 3	4 1	8	350	113
3d Plat—Old Land.								
Compost—Cotton Seed, Stable Manure & Etiwan Dis. Bone	400	1	4 12	3 12	4	1 8	525	169⅓
Comp.—Cot. Seed, Sta. Manure	400	8 5	12 1	8 3	4 1	8	438	141¼
Cotton Seed.....	400	1 8	4 3	3 12	3		534	172¼
aGeorgia Fertilizer.....	400	1 8	4 8	3 4	2		525	169⅓
Unmanured.....		8 2	8 2	4 3	4 1	8	350	113

EXPERIMENT OF MR. J. C. MIDDLEBROOKS, BARNESVILLE, PIKE COUNTY, GEORGIA.

Mr. Middlebrooks received from the Department, samples of Gossypium Phospho and Albemarle Guano for soil test.

Soil of first plat, red; of second plat, gray and sandy, cleared about 50 years ago; original growth, oak, blackjack and chestnut; second growth, old-field pine, re-cleared about 15 years ago.

Previous treatment.—The land was in oats in 1877, in turnips in 1878, and in potatoes and sorghum in 1879, manured with scrapings from lot and barnyard.

Preparation.—It was broken in March with a 2-horse Stark Dixie without wing. Width of rows, 3 feet; length, 70 yards.

Fertilizers were applied April 15th in the opening furrow, and bedded on in the usual way.

Planted April 15th with Dow-Law planter.

Cultivation.—Harrowed May 10th with iron-tooth harrow; plowed 15th with sweep; 18th, hoed; 28th, plowed with sweep; June 10th, hoed; 21st, plowed with sweep; 25th, hoed; July 29th, plowed with sweep and laid by.

Seasons favorable during the growing months.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st	2d	3d	4th	Yield in Seed Cotton per Acre.
		Picking	Picking	Picking	Picking	
		Aug. 30.	Sept. 16.	Oct. 23.	Nov. 19.	
<i>Plat No. 1.—Red Land.</i>						
<i>a</i> Gossypium.....	200	lbs. oz	lbs. oz.	lbs. oz.	lbs. oz.	lbs.
<i>a</i> Albemarle.....	200	4	14 8	8	1	962
Pamlico.....	200	4 8	11	7	1 8	840
Natural Soil.....	200	6 8	11	7	1 8	910
<i>Plat No. 2.—Sandy Soil.</i>		1	8 4	5	2 4	577
<i>a</i> Gossypium.....	200	1 8	5	8 8	$\frac{1}{2}$	542
<i>a</i> Albemarle.....	200	5	9 8	7 8	10	792
Pamlico.....	200	6 4	11	7 8	10	888
Natural Soil.....		8	2 8	6	10	336

I have abandoned the use of commercial fertilizers for the past few years, but from my experiments the present year I am in favor of some of the guanos that I have used this year. I have been using compost for a few years, made of cotton seed, scrapings of the lot, lime and salt, which has given satisfaction until this year. The fertilizers used this year have given perfect satisfaction.

EXPERIMENT OF MR. W. J. GOSS, HARMONY GROVE, JACKSON CO.

Mr. Goss received from the Department samples of Dobb's Ammoniated Cotton Fertilizer, and Navassa Acid Phosphate.

Soil, red mulatto; original growth, oak, hickory and blackjack; was turned out about 15 years ago, and had grown up in old-field pines. In the winter of 1876 the pines were cut down and the land put under fence. It was poorly cultivated and lightly fertilized three years previous to 1880.

Previous treatment.—The land has been cultivated three years in corn except one year, when a portion of it was planted in potatoes.

Preparation.—The land was thoroughly plowed with a 12 inch scooter, and then furrows were opened with a shovel plow, 4 feet wide and 35 yards long.

Fertilizers were applied in the shovel furrows at the rate of 200 pounds per acre and bedded with scooter plows.

Planting—April 20th, the beds were opened with a small scooter, the seed distributed and covered with an iron fork made for the purpose.

Cultivation.—May 20th, the cotton was chopped to a stand, it having been previously sided with a small scooter. June 1st it was plowed with a heel-sweep and shovel, and hoed. Plowed again June 15th; plowed and hoed the second week in July and laid by.

Seasons were favorable to the growth of cotton until June 15th, when a drouth of six weeks injured the crop, causing it to shed at least one fourth of its forms.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking: the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertili- zer ap- plied pr Acre.	1st Picking Sept. 1.	2d Picking Sept. 15.	3d Picking Oct. 15.	4th Picking Nov. 15.	Yield in Seed Cotton per Acre.
	lbs.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs.
<i>a</i> Dobbs' Ammoniated Cotton Fertilizer.	200	4	7	5	3	323
Natural soil.....	..	..	3	5	3	187
<i>a</i> Navassa Acid Phosphate Compost.....	200	6	11	7	2	408
Natural soil.....	..	..	2 12	4	3	165
Snowden's Acid Phosphate Compost....	200	6	14	8	2	476
Natural soil.....	..	..	3	5	3	187

Mr. Goss remarks: "The land on which the test was made was as poor as any we have in this country. I selected the poorest land I could find, in order to see the difference satisfactorily. I think it will pay to use fertilizers, even on the poorest land "

EXPERIMENT OF MR. J. T. LINDLEY, POWDER SPRINGS, COBB COUNTY, GEORGIA.

Mr. Lindley received from the Department samples of Dissolved Bone and Vulcanite Guano No. 3 (for truck).

Soil—Dark gray, with clay subsoil; has been in cultivation thirty years; original growth oak, chestnut and hickory.

Previous treatment—The land was cultivated in wheat in 1877, manured with cotton seed; was in cotton in 1878, manured with guano; and was in wheat in 1879, manured with cotton seed.

Preparation—The land was turned with one-horse turning plow; rows three feet wide and thirty-five yards long.

Fertilizers were applied at the rate of 200 pounds per acre, in the shovel plow furrows, and listed on with turning plow April 3d.

Planting—April 17th the beds were opened with a small p'ow, the cotton seed sown by hand and covered with a harrow.

Cultivation—The cotton was plowed May 11th and 21st, June 10th and 23d, and July 5th, and hoed May 17th and June 5th.

Seasons—There was rain May 21st and 30th, June 1st, 7th, 25th, 26th and 30th, July 3d, 15th and 23d, and August 3d, 4th, 5th, 6th, 11th and 20th.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertili- zer ap- plied pr Acre.	1st Picking Aug. 30.	2d Picking Sept. 14.	3d Picking Oct. 6.	Yield in Seed Cotton per Acre.
	lbs.	lbs. oz.	lbs. oz.	lbs. oz.	lbs.
<i>a</i> Vulcanite Guano, No. 3 (for truck).....	200	1	2 8	2 8	840
<i>a</i> Dissolved Bone.....	200	1	3	3 8	1050
Unmanured.....	...		1 8	3 8	700
Sternes' Ammoniated Dissolved Bone.....	200	1	3	3 8	1050
Baldwin Ammoniated Dissolved Bone.....	200	1	3 8	3	1050
Farmers' Friend.....	200	1	3	3 8	1050

Comment—It is very remarkable that four different fertilizers should have given exactly the same results, especially in the metamorphic belt in which it is so extremely difficult to find even a small plat of ground of uniform fertility.

Mr. Lindley says: "My experience with fertilizers is that they pay from twenty-five to fifty per cent. I think 125 pounds per acre pay better than any other amount. Compost made from stable manure, cotton seed and some good dissolved bone, is the best fertilizer a farmer can use, as the cost is very little compared with that of commercial fertilizers."

EXPERIMENT OF MR. T. N. DELANY, WOODSTOCK, CHEROKEE COUNTY, GEORGIA.

Mr. Delany received from the Department samples of Vulcanite Guano No. 1, Vulcanite Guano No. 2, Eutaw Acid Phosphate and Bale's Acid Phosphate.

Soil—Dark gray, with clay subsoil—has been in cultivation fifteen years. Original growth, post oak and hickory.

Previous treatment—Corn and oats have been grown alternately on the land for several years, without fertilizers.

Preparation.—The land was broken deeply with scooter plow, after which rows were opened three feet wide and thirty-five yards long, with one horse turn plow.

Fertilizers were applied in the open furrow at the rate of 200 pounds per acre, and bedded on with turning plow. Compost was made according to the formula given by the Department.

Planting.—April 15th the beds were opened with scooters, the seed strewn by hand, and covered with a harrow.

Cultivation.—April 28th harrowed off the ridges just as the cotton began to come up. May 4th, chopped out and plowed with small cultivator. May 15th, the same cultivation repeated. May 30th, plowed out with sweeps. June 15th, plowed again with sweeps.

Seasons were favorable during May and June, and the crop then two weeks earlier than last year; but a drouth in July completely arrested the growth of the crop, and there was but little fruit made after that time.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st Picking		2d Picking		3d Picking		Yield in Seed Cotton per Acre.
		Sept. 3.	Oct. 25.	Sept. 3.	Oct. 25.	Nov. 25.		
Without fertilizer.....		lbs. oz. 3 8	lbs. oz. 4 8	lbs. oz. 1				730
<i>a</i> Vulcanite Guano, No. 1 (for cotton).....	200	4 12	6 8	1				856
<i>a</i> Vulcanite Guano, No. 2 (for rice).....	200	6	7	1				980
<i>a</i> Eutaw Acid Phosphate.....	200	7 12	9	1 4				1260
<i>a</i> Bale's Acid Phosphate.....	200	6	9	1 8				1115
Bale's Acid Phosphate Compost.....	200	6	8	1 8				1085

EXPERIMENT WITH RICE.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	Rice—Bushels per Acre.	Date of Planting.	Date of Maturity
Without fertilizer.....		21	Apr. 15	Oct. 25.
Navassa Ammoniated Soluble Phosphate.....	200	22	"	"
<i>a</i> Vulcanite Guano, No. 1 (for rice).....	200	23	"	"

Mr. Delaney says: "Commercial fertilizers may be used to profit by judicious application, but composts are much more economical."

EXPERIMENT OF MR. W. A. STEWART, McDONOUGH, HENRY COUNTY, GEORGIA.

Mr. Stewart received from the Department samples of Bradley's Ammoniated Dissolved Bone, Baugh's Raw Bone and Cumberland Super-phosphate of Lime.

Soil—Dark red, with stiff red subsoil; has been in cultivation about forty years. Original growth, red oak, black oak, post oak and hickory.

Previous treatment.—This plat was in oats in 1878 and 1879, without fertilizers.

Cultivation.—The land was turned in December last with one horse Avery plow followed by a subsoil plow. Before planting, it was rebroken with a square pointed scooter two inches wide and about fourteen inches long. This plat lay on the top of a hill, with a slight southern exposure—a second plat had a northern exposure. These locations were selected to observe the effects of exposure on the young cotton, but the cold winds came from the N. E. and affected the two equally. The rows were three feet wide, and 210 feet long.

Commercial fertilizers were applied at the rate of 200 pounds per acre; compost of stable manure, cotton seed, salt and water was applied at the rate of from 300 to 500 pounds to the acre.

Planted soon after the 15th of April with Garlington cotton planter, using five pecks of seed per acre.

Cultivation.—As soon as the cotton came up, it was harrowed, and in five or eight days regular plowing and hoeing was commenced, and plowed one week and hoed the next until July, when it was laid by. The cotton was plowed very shallow after the second time, using sweep or scrape.

Seasons—Cold, wet weather in the spring retarded the growth of the cotton and impaired the stand. This continued to June 10th, when it became warm and dry 'till the first of August, when rains commenced again.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs of Fertili- zer ap- plied pr Acre.	t Picking Aug. 25.	2d Picking Sept. 23.	3d Picking Oct. 14.	4th Picking Nov. 24.	Yield in Seed Cotton per Acre.
First Plat.						
<i>a</i> Bradley's Ammoniated Dissolved Bone.....	200	lbs. 2½	lbs. 8	lbs. 4	lbs. 1½	1,102½
Natural soil.....		1	4¾	4	1	752
Compost, stable and cotton seed and 100 lbs. Baugh's Raw Bone.....	300	3¼	8	6½	2	1,865½
Nothing.....		¾	4	4	1½	717½
<i>a</i> Cumberland Superphosphate of Lime.....	200	2¼	7	5½	3½	1,277½
Nothing.....		1	3½	4½	2	770
<i>a</i> Baugh's Raw Bone Super-phos. of Lime.....	200	2½	7¼	6½	2¼	1,295
Second Plat.						
<i>a</i> Bradley's Ammoniated Dissolved Bone.....	200	2	7¾	6½	3	1,170
Natural soil.....		½	2	5½	2	700
Compost, stable 300 lbs., cotton seed 100 lbs., 200 lbs. Baugh's Raw Bone Sup'phos.....	600	3½	8	6½	2	1,417
Natural soil.....		½	2	4	4	735
<i>a</i> Cumberland Superphosphate of Lime.....	200	3	7¾	6	1½	1,225½
Natural soil.....		¾	3	5	1½	717½
<i>a</i> Baugh's Raw Bone Super-phos. of Lime.....	200	2½	6½	7	1	1,190

"These plats were very much alike, were planted same day, worked same day, picked same day, and were treated alike in every respect, about all the difference was the exposure."

Mr. Stewart says: "My experience is that where there is plenty of vegetable matter in the soil fertilizers can be used to good advantage. I have used guanos of different kinds ever since they first came into the settlement—have used fourteen different kinds, and have never used but one brand that did not pay me. I have used from 50 lbs. to 500 lbs. to the acre, and I am satisfied that 200 lbs. per acre pays me better than more or less. I think, by plowing deep and having plenty of vegetable matter in the soil and broadcasting, I could use 500 lbs. and not lose by it, but 500 lbs. applied in the drill will burn up the crop so that only a small July crop is made, and then, just before frost it takes a second growth, which does no good except to make vegetable matter for the next year."

EXPERIMENT OF MR. JAMES M. COX, WOODVILLE, GREENE COUNTY, GEORGIA.

Mr. Cox received from the Department samples of E. Frank Coe's Ammoniated one Superphosphate, and Lister Bros.' Standard Pure Bone.

Soil—Light sandy, second bottom; original growth, sweet gum and oak; has been in cultivation twenty years.

Previous treatment—The plat has been cultivated in corn and wheat, without fertilizers; was in corn in 1879.

Preparation—The land was broken 1st of February, with one-horse turn plow; March 25 rows were laid off three feet wide and seventy yards long.

Fertilizers were applied in these furrows March 25, and listed on in the usual way.

Planting—April 18 opened the beds with Coulter, sowed the cotton seed, and covered with harrow.

Cultivation—The cotton was plowed May 5, with a sweep, and hoed on the 11th; then plowed every two weeks with sweep, and hoed also until laid by.

Seasons—There were heavy rains April 19th and 25th; there was then no rain till July 28, and all growth stopped; the crop was cut off about one-half; the season was very unfavorable for fertilizers on account of the drouth.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertilizer applied per Acre.	1st Picking Sept. 10.	2d Picking Oct. 8.	3d Picking Oct. 21.	4th Picking Nov. 24.	Yield in Seed Cotton per Acre.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
2E. Frank Coe's ammoniated Bone Super-phos	200	14	17	10	5	1.610
2L. Lister Bro's Standard Pure Bone	200	15	18	14	4	1.745
A. C. Ladd's Lime and Ashes	200	13	18	16	4	1.785
Nothing		13	21	15	5	1.925

Mr. Cox says: "During the last few seasons crops have done better with little fertilizers, for where the land was heavily manured vegetation fired worse. This year's drouth has been an unusually severe one. Up to the time of the drouth crops were very promising. When we have good seasons fertilizers increase the yield and cause cotton to produce and mature earlier than the natural soil.

EXPERIMENT OF MR. ELIJAH BELLFLOWER, DAWSON, TERRELL COUNTY, GEORGIA.

Mr. Bellflower received from the Department samples of Crescent Bone, Colgate manure and Lister Bro.'s Standard Pure Bone.

Soil--Red sandy, subsoil hard and red; has been in cultivation forty years. Original growth, pine.

Previous treatment--The land was in wheat in 1878, with 100 pounds fertilizer, and laid out in 1879.

Preparation—January 1st the land was broken twelve inches deep with two horse Brinly subsoil plow. March 13th furrows seventy yards long and three feet wide were laid off with a ten inch shovel.

Fertilizers were distributed in the bottom of these furrows and bedded on in the usual way.

Planting—April 16th the beds were opened with a scooter, the seed sown by hand and covered with board.

Cultivation—May 7th, sided with small turning plow; 17th, chopped to a stand; 20th, sided with small scooter. June 15th, plowed with four inch scooter and scrape; June 17th, hoed. July 5th, plowed with scooter and scrape, three furrows to the row, and laid by July 30th with hoe.

Seasons.—It was very dry till first of May, with favorable effects on cotton; then very wet till June 1st, causing some injury to cotton; then partial showers till August 17th. During this period extreme heat caused cotton to shed its fruit.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertilizer applied pr Acre.		1st Picking		2d Picking		3d Picking		seed Yield in Cotton per Acre.
			Aug. 24.		Sept. 23		Nov. 17.		
	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.
αColgate Manure.....	200	5	7	10	2	4			1050
Lister Bro's αCrescent Bone fertilizer.....	200	6	4	5	12	1	8		1750
αLister Bro.'s Standard Pure Bone.....	200	6	12	6	12	4			1225
Sea Island Guano.....	200	4	8	6	4	2			857½
Black's Patent Compost.....	200	2	8	2	12	4	8		647½
Kainite Compost.....	200	2	2	2	12	4	4		445
Without Manure.....		1	8	3	8	2			410

Note.—The Kainite compost was made as follows: 700 pounds cotton seed, 1,000 pounds sheep-lot manure, 100 pounds common salt and 100 pounds Kainite were composted together and applied at the rate of 200 pounds per acre.

Remarks.—It is not a little remarkable that farmers will purchase patent formulæ for composts when they can get better ones free of charge. The results in Mr. Bellflower's experiment are not very strong endorsements of the formulae used by him in composting. The purchase of such patents, and of trees from peddlers, illustrates the disposition of our people to be humbugged.

EXPERIMENT OF MR. M. R. RUSSELL, OF CARROLLTON, CARROLL COUNTY, GEORGIA.

Mr. Russell received from the Department a sample of Zell's Ammoniated Bone Phos.

Soil.—Stiff clay; has been in cultivation about twenty-five years. Original growth, red, black and post oak.

Previous treatment.—Since 1865 the land has been cultivated in cotton two years and sown in wheat one year. Commercial fertilizers were applied to the cotton, and cotton seed to the wheat. It was in sweet potatoes in 1879 without manure.

Preparation.—The land was broken March 20th with one-horse turn plow. April 28th opened furrows three feet apart and thirty-five yards long, with ten inch shovel.

Fertilizers were applied in these furrows at the rate of 250 pounds per acre, and bedded on with four furrows of one-horse turn plow.

Planting.—April 29th, opened the beds with a small scooter, sowed the seed and covered with a double stock.

Cultivation.—A poor stand was secured. May 27th, chopped out; June 2d

plowed out; June 8th, sided; June 16th, hoed; June 19th, plowed out with scooter, and with scrape July 5th.

Seasons.—During April it rained on the 3d, 8th, 14th, 19th, 22d, 24th and 27th. In May on the 2d, 3d and 4th.

{TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertilizer applied pr Acre.	1st Picking		2d Picking		3d Picking		Yield in Seed Cotton per Acre	Yield in Lint Cotton per Acre.
		Sept. 20.		Oct. 4.		Nov. 15.			
		lbs.	oz.	lbs.	oz.	lbs.	oz.		
Hope Guano.....	250	7½	13½	8½		1015	389		
Nothing.....		4	9	10		805	304		
Chesapeake Guano.....	250	7	15	15		1275	495		
Nothing.....		5½	12½	6		840	304		
αZell's Ammoniated Bone Phos.....	250	8	17	13½		1347	526		
Nothing.....		5	9½	11		883	334		
Eagle Ammoniated Bone Phos.....	250	7	14½	9½		1060	405		
Nothing.....		4	9	10		805	305		

Mr. Russell says: "I have been using commercial fertilizers for many years, and am satisfied they will always pay if judiciously used, and my experience is that it pays best on our soil to use about 200 pounds per acre, applied very deep, running off the rows with a scooter plow, following in the same furrow with a long, straight steel shovel. I put the guano in that furrow and run two first listing furrows with three inch scooter, following with two furrows of turn plow to finish the beds I made this year 575 pounds of lint cotton on one acre of poor land with 200 lbs. of guano. I broke the land well, laid off the rows three feet wide with a shovel, put in the guano and followed in the same furrow with scooter plow, mixing guano and soil together. I would have made two bales but for the August drouth. A good compost of stable manure and cotton seed, mixed in equal quantities and penned up dry for six weeks, is the best fertilizer for our land that we have, either for corn or cotton, if we could only get enough of it."

EXPERIMENT OF MR. H. T. PATTERSON, OF SUNNY SIDE, SPALDING COUNTY, GEORGIA.

Mr. Patterson received from the Department samples of Star Brand Complete Cotton Manure and Alta Ammoniated Guano.

Soil—Stiff, red; has been in cultivation about thirty years; original growth, post oak, red oak, hickory and chestnut.

Previous treatment.—The land was in cotton in 1877, corn in 1878, and oats in 1879. About 200 pounds of commercial fertilizers were applied per acre to cotton in 1877. No fertilizers have been applied since until this year.

Preparation.—The land was turned with a two-horse plow in September, 1879. The plat was as uniform as it could be gotten. April 12th, laid off rows thirty-five yards long and three feet wide, with ten inch shovel. In these furrows the *Fertilizers* were applied at the rate of 200 pounds per acre, and the land bedded with common turn plow.

Planted April 15th, using the Oxford planter.

Cultivation.—Plowed May 17th with double stock plow; chopped out May 15th; plowed 21st with double stock; hoed June 3d; plowed the 11th with double stock and June 28th with sweep; hoed July 6th, and plowed July 15th and laid by.

Seasons.—April 19th, rain; 20th, 23d and 26th heavy rains; May 2d and 3d heavy rains; 21st and 30th rain. June 1st rain, and on the 7th the heaviest known by the oldest citizen in fifty years, injuring the crops seriously. June 23d light rain; 25th and 26th rain. July 14th rain, after which there was no rain until August; when there was too much for cotton.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st Picking		2d Picking		3d Picking		Yield in Seed Cotton per Acre
		Sept. 10.		Sept. 28.		Oct. 29.		
αStar Brand Complete Cotton Manure.....	200	8		8		6		770
Without fertilizer				4	8	7	8	420
Horner's South Sea Guano.....	200	10	8	7		6		822
Baugh's Raw Bone Sup. Phos. of Lime....	200	13		6	8	6	8	910
Without fertilizer.....				6	8	8	8	525
Baldwin's Ammoniated Dissolved Bone...	200	15		6		6		945
Without fertilizer.....				7		8	8	542
Soluble Pacific Guano.....	200	15		5	8	6		927
Without fertilizer.....				7	8	8	8	560
αAlta Ammoniated Guano.....	200	13		6	8	6		894
Without fertilizer.....				7		9		560
Farmer's Friend.....	200	12		7		7		910
Without fertilizer.....				7	8	9		578
Bradley's Patent Superphosphate.....	200	12	8	7	8	8		980
Without fertilizer.....				8		9		596
Patapsco Guano.....	200	12		7		7		910
Without fertilizer.....				7	8	9		578
Merryman's Ammoniated Dissolved Bone	200	12	8	7	8	8		980

EXPERIMENT OF MR. C. M. WITCHER, POINT PETER, OGLETHORPE COUNTY, GA.

Mr. Witcher received from the Department samples of Navassa Acid Phosphate and Piedmont Guano.

Soil—gray sandy loam, subsoil yellowish red clay, lightly porous; recleared, three years ago; growth, a few pine bushes; original growth, red-oak, spanish-oak, black-gum and some hickory; cleared the first time sixty-odd years ago, and cultivated nearly ever since.

Previous treatment—Has been cultivated in cotton continuously, and had a light application of Ammoniated Bones in 1878.

Preparation—April 1st, laid off rows 4 feet wide and 35 yards long, running twice with long ripper, listed with the same, and finished with Wixon turn-plow, breaking middles with ripper.

Fertilizers—were applied at the rate of 200 lbs. per acre in the opening furrows.

Planted—April 22d; opened beds with coulter and following-block; scattered seed and covered with iron-tooth harrow.

Cultivation—May 7th, sided with ripper; 10th, chopped out; 26th, sided with solid sweep; June 1st, hoed; 18th, plowed with solid sweep; 25th, hoed; July 5th, sided with heel-sweep.

Seasons—May 7th, having had rain, a good stand was up; 22d, good rain; 23d, good rain; 29th, light rain; June 7th and 15th, light rains; 16th and 26th, heavy rains; July 1st, 10th, 14th, 22d and 25th, light rains; 30th, good rain; August 3d, good rain; 4th, light rain; 5th, cold east rain. All the rains in July were so very light that cotton suffered—commenced shedding on the 10th.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	2d Picking	3d Picking	Yield in Seed Cotton per Acre.
		Sept. 28.	Nov. 12	
Baldwin's Ammoniated Dissolved Bone.....	200	9 12	0 4	518
No fertilizer.....		5	1 6	330
Lister Bro's Crescent Bone Fertilizer.....	200	9	0 12	504
No Fertilizer.....		6	1 12	401
Bradley's Ammoniated Dissolved Bones.....	200	8 12	0 4	468
No fertilizer.....		6 4	1 8	401
αPiedmont Guano.....	200	8 12	0 4	468
No fertilizer.....		6 8	1 4	401
Patapasco Acid Phosphate.....	200	9 8	0 12	531
No fertilizzer.....		4 8	1 12	323
αNavassa Acid Phosphate.....	200	9 8	1 8	518

NOTE.—The above are the results of the 2d and 3d pickings. The memoranda of the 1st picking were lost.

Mr. Witcher says, in regard to the first picking: "There was none picked at that time from the unfertilized rows, but the amount picked from the fertilized rows was nearly equal to the second picking, with the exception of the two phosphates, which had not more than half as much."

EXPERIMENT OF MR. J. B. MURRAY, GARDEN VALLEY, MACON COUNTY, GEORGIA.

Mr. Murray received from the Department samples of Mastodon Ammoniated Sol. Phos., Albemarle Guano and Sterling Guano.

Soil—Sandy, with clay subsoil. Has been in cultivation thirty years. Original growth, pine.

Previous treatment.—The plat was cultivated in sweet potatoes in 1878, with 200 pounds of fertilizer per acre, in wheat in 1879, followed by potatoes the same year, with 200 pounds of Wilcox & Gibbs' Manipulated Guano per acre.

Preparation.—The plat was broken up with turn plow early in April. April 30th, laid off rows three feet wide and thirty-five yards long, with seven inch shovel plow.

Fertilizers were applied April 30th in the shovel furrows.

Planted May 1st, with Dow Law cotton planter.

Cultivation.—May 15th, barred off with turn plow; May 20th, chopped out and sided with winged sweep. Continued plowing every fifteen days with sweep until 1st August.

Seasons were very favorable to June 10th. Had but little rain from May 30th to July 23th. This protracted drouth seriously injured all crops.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertiliz- er ap- plied pr Acre.	1st		2d		3d		4th		Yield in Seed Cotton per Acre.
		Picking		Picking		Picking		Picking		
		Aug. 25	Sept. 29	Oct. 4.	Oct. 19.					
	lbs.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.
aMastodon Am'd Sol. Phos.....	200	2		13		3	8		8	1260
Without fertilizer.....		1	8	11	8	2	8		8	1120
aAlbemarle Guano.....	200	2	8	19	8	5		1		1960
Without fertilizer.....		2		18		5		2	8	1925
aSterling Guano.....	200	2		15		2	8		8	1400
Without fertilizer.....		2		11		5		2		1400
aWilcox & Gibbs' Manipulated Guano	200	2	8	15		4	8	1	8	1645
Without fertilizer.....		1	8	12		4	6	2	8	1435

P. S.—The Albemarle fertilizer was through the best part of the plat.

EXPERIMENT OF MR. A. A. BELL, ATHENS, CLARK COUNTY, GA.

Mr. Bell received from the Department samples of Orient Complete Manure and Navassa Guano.

Soil.—The Orient Complete Manure was used on red land; the balance on light gray soil. Original growth, on the red land, oak and hickory; on the gray land, forest pine.

Previous treatment.—Until this year the farm has been planted wholly in corn and small grain. No commercial fertilizers have been used, but from year to year large amounts of stable manure have been applied and green crops turned under.

Preparation of the red land.—In January opened rows three-and-a-half feet apart with long steel shovel; applied in the drill ten bushels cotton seed, and listed with a long turn plow. In April opened the list with fourteen inch scooter, applied fifty pounds Orient Complete Manure per acre, and bedded as usual.

The gray land was thoroughly broken in January and February, and bedded in the usual way. All the rows three-and-a-half feet wide.

Fertilizers were applied in quantities as stated in the table. The compost was prepared as follows: Commenced with a layer of stable manure six inches deep, then cotton seed same thickness, and then Atlantic Acid phosphate, and so on till the heap was completed. The cotton seed were thoroughly wet.

Planting.—The seed were rolled and planted April 15th, as follows: The beds were opened with six inch steel shovel, the seed sown and covered with harrow.

Cultivation.—May 8th, sided with Lester subsoil plow, and chopped to a stand; after two weeks plowed out with large steel shovel, and every two weeks thereafter with same plow till July 8th, when it was plowed out with sweep.

Seasons good till July, when there was too much rain.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER	Lbs. of Fertilizer applied per acre	1st Picking		2d Picking		3d Picking		4th Picking		Yield in Seed Cotton per Acre.	Yield in Lint Cotton per Acre.
		Sept. —	Oct. —	Sept. —	Oct. —	Nov. 1.	Nov. 1.	Nov. 26.	Nov. 26.		
		lbs.	lbs. oz.	lbs.	lbs. oz.	lbs.	lbs. oz.	lbs.	lbs. oz.	lbs.	lbs.
Orient Complete Manure and 300 lbs. cotton seed.....	350	300		350		300		250		1200	415
Without fertilizer		100		125		190		60		475	161
Soluble Sea Island Guano.....	200	500		300		200				1000	350
Without fertilizer.....		110		200		150		130		640	180
Atlantic Acid Phosphate.....	200	150		200		238		312		900	310
Without fertilizer.....				100		210		112		322	107½
Compost.....	300	85		170		200		220		675	230
Without fertilizer.....		50		100		180		60		390	

EXPERIMENT OF MR. THOS. H. STALLWORTH, SANDY RIDGE, HENRY COUNTY.

Mr. Stallworth received from the Department samples of Wando Acid Phosphate, Sterling Guano and Bowker Cotton Super-phosphate.

Soil—mulatto, with fine dark clay subsoil; original growth, oak, hickory, dogwood; was cleared in 1866.

Previous treatment—The land was in corn and peas the first three years, without fertilizers. Since then it has been cultivated in wheat, cotton and corn. When in wheat, about twelve bushels cotton seed were applied per acre; and when in cotton, from 100 to 125 lbs. commercial fertilizer per acre, with only two years' rest to date.

Preparation.—The land was broken deep in January, with long steel three-inch scooter. The plat was arranged as directed in Circular No. 4—rows 3 feet wide and 70 yards long.

Fertilizers were applied April 12th on plat No. 1 at the rate of 200 lbs. per acre, with distributor. On plat No. 2 they were applied at the rate of 100 lbs. per acre. Both plats were prepared and planted at the same time and in the same way, except that the Bowker Cotton Super-Phosphate was not received until May 5th, and hence the cotton to which it was applied was planted after the cotton on the balance of the plat was up.

Planting.—April 26th opened the beds with a two-inch scooter, strewed the seed by hand and covered with scooter, throwing a good deal of soil upon the seed to retain moisture. May 5th, knocked off the ridge above the seed. May 14th, sided

with small scooter, and when the bud-leaf was well formed, thinned out to one stalk every twelve inches, following with small scooter, sifting the fine earth around the stalks.

Seasons—"Delightful, with only a few days' drouth, which was beneficial, as it checked the growth."

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st	2d	3d	Yield in
		Picking	Picking	Picking	Seed
		Sept. 23.	Oct. 10.	Nov. 13.	Cotton per Acre.
		lbs. oz.	lbs. oz.	lbs. oz.	lbs.
Plat No. 1.					
αWando Acid Phosphate	260	36	16	1	1855
αSterling Guano	200	30	14	1½	1592½
αOber's Dis. Bone Phos. S. C.....	200	25	14	3	1470
αBowker's Cotton Superphos. (rec'd late) ..	200	24	13	1	1330
Average of unfertilized rows		20	13	4	1295
Russell Coe's Am'd Bone Superphosphate.	200	38	14	2	1890
Baugh's Raw Bone Sup. Phos. of Lime	200	33	14	2	1715
Merrymau's Am'd Dissolved Bones.....	200	35	13	3	1785
Brighton's Am'd Bone Superphosphate....	200	27	13	4	1540
Orient Complete Manure.....	200	32	14	2	1680
Plat No. 2.					
Wando Acid Phosphate	100	24	14	3	1435
Sterling Guano	100	21	14	4	1365
Ober & Son's Sol. Superphosphate of Lime	100	25	13	5	1505
Bowker's Cotton Superphosphate.....	100	23	12	2	1295
Average of Unmanured Plats.		21	14	2	1295
Russel Coe's Am'd Bone Superphosphate..	100	23	15	2	1400
Baugh's Raw Bone Superphos. of Lime....	100	21	14	6	1435
Merrymau's Am'd Dissolved Bones	100	23	14	5	1470
Brighton's Am'd Bone Superphosphate....	100	22	14	5	1435
Orient Complete Manure.....	52	21	14	3	1330

Mr. Stallworth says: "I will say, in every instance with me, when we have had average seasons, all the fertilizers that have been analyzed by the Department of Agriculture have paid a good per cent. I have nine tenants using different brands of fertilizers that will average a 500 pounds bale for every two acres."

EXPERIMENT OF MR. W. D. H. JOHNSON, HOLSTON, BIBB CO., GA.

Mr. Johnson received, as Secretary of the Ocmulgee Farmers' Club, from the Department samples of Gossypium Phospho, Patapsco Ammoniated Soluble Phosphate, Monarch Guano, Orient Complete Manure, and Vulcanite Guano No. 3 (for truck).

Soil—Sandy loam, been in cultivation 40 years; original growth, oak and hickory. The plat is upland with western exposure. Soil 12 inches deep, with compact red clay subsoil. Land well supplied with humus.

Previous treatment.—The land was in oats in 1878-9, without manure.

Preparation—February 17th, broke the land broad-cast with 12-inch scooter; April 16th, laid off rows 70 yards long and 3 feet wide with long shovel.

Fertilizers were applied in these furrows at the rate of 200 lbs. per acre, and list. ed on with cast-iron turn-plow, the beds finished with a shovel plow. The acid phosphates were composted by formula published by the Department. Another compost was made by mixing 50 lbs. Ammoniated Dissolved Bone, $1\frac{1}{2}$ bushels salt, $1\frac{1}{2}$ bushels poultry scrapings, $1\frac{1}{2}$ bushels wood ashes, 5 lbs. kainit and 50 lbs. woods earth.

Planting was done April 17th with a planter, applying the seed quite thick to secure a perfect stand.

Cultivation.—May 16th, sided with sweep and chopped to a stand; plowed every twenty days then till laid by—twice with solid sweep and once with winged sweep.

Seasons were moderately good till June 3d, succeeded by a drouth of 8 weeks. The dry and hot weather coming upon the cotton at that stage of its growth, when it should have been growing and fruiting, caused it to be stunted. The rains came too late for a reaction, causing a short crop.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre.	Yield in Seed Cotton per Acre.
<i>α</i> Gossypium Phospho.....	200	793
<i>α</i> Patapsco Ammoniated Soluble Phosphate.	200	740
<i>α</i> Monarch Guano.....	200	781
<i>α</i> Orient Complete Manure.....	200	750
<i>α</i> Vulcanite Guano No. 3. (for truck)	200	635
Soluble Pacific.....	200	778
Acid Phosphate Compost.....	200	824
Compost No. 2, Dis. Bone, etc., etc.....	200	615
No fertilizer—average of the two middle rows.....		527

Mr. Johnson says: "I am not prepared to say that commercial fertilizers pay more than a small per cent. on the capital used in a series of years. The gain in one year is more than probably lost in another. Not so with the composts—have never known loss to occur from their use, and have never even heard of complaint."

EXPERIMENT OF MR. B. N. SEAGO, AUGUSTA, RICHMOND CO., GA.

Mr. Seago received from the Department samples of None Such Manipulated Guano, Pacific Guano Company's Compound Acid Phosphate, and Patapsco Ammoniated Soluble Phosphate.

Soil—sandy, with clay subsoil; has been in cultivation ten years since the second growth of old-field pine was cleared off; original growth supposed to have been oak, pine and hickory.

Previous treatment.—In the fall of 1877 the land was sown in oats, with 40 bushels cotton seed per acre. In 1879 it was planted in sweet potatoes, with about 50 bushels cotton seed per acre.

Preparation.—The first week in March the rows were laid off $3\frac{1}{2}$ feet wide and 35 yards long, and the land bedded out with turn-plow; April 27th, a two-horse shovel plow was run in the water furrow, in which the

Fertilizers were distributed at the rate of 200 lbs. per acre.

Compost was made as follows: To two lbs. green cotton seed, added one pound acid phosphate, wetting the cotton seed thoroughly and mixing well, and leaving in bulk three or four weeks before using. After the fertilizers were applied, and before bedding, a subsoil plow was run in the furrow to mix them with the soil. The land was then bedded in the usual way.

Planted, April 28th with Dow-Law planter.

Cultivation.—May 12th, barred with turn-plow; 19th, chopped to a stand and hoed; 27th, sided with "buzzard" plow; June 4th, ran three furrows to the row with same plow; 18th, hoed; 26th, ran three furrows with "buzzard" plow; July 19th, plowed every other middle with same plow; 26th, plowed out the balance in the same way.

SEASONS.

Date.	Hour.	Tem- pera- ture.	Rainfall, in inches	Date.	Hour.	Tem- pera- ture.	Rainfall, in inches.
June 11.....	11.30 a.m.	92°	$1\frac{1}{8}$	July 20.....	2 p.m.	94°	$\frac{3}{4}$
June 16.....	7 p.m.	80	$1\frac{1}{8}$	July 21.....	5 p.m.	82	$\frac{1}{2}$
July 2.....	9 p.m.	90	$\frac{1}{4}$	July 22.....	11 a.m.	85	$\frac{1}{8}$
July 5.....	1 p.m.	98	$\frac{1}{6}$	July 22.....	9.30 p.m.	83	$\frac{1}{8}$
July 7.....	1.15 p.m.	99	$\frac{3}{16}$	July 23.....	All day.	80 70	$1\frac{1}{2}$
July 7.....	6 p.m.	82	$\frac{1}{8}$	August 4.....	10.15 p.m.	82	$1\frac{1}{4}$
July 9.....	5.15 p.m.	98	$\frac{3}{16}$	August 5.....	4 p.m.	86	1
July 10.....	2 p.m.	93	$\frac{3}{8}$	August 5.....	7 p.m.	80	$1\frac{1}{8}$
July 14.....	5 p.m.	90	$2\frac{1}{8}$				
July 15.....	11 a.m.	88	$\frac{1}{2}$				

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Ferti- lizer applied per acre.	1st Picking		2d Picking		Yield in Seed Cotton per Acre.
		Sept. 10.	Oct. 19.	Sept. 10.	Oct. 19.	
αPatapsco Ammoniated Soluble Phosphate.....	200	21	9 8	1830		
Without fertilizer.....		14	7	1260		
Barry's Chemical Fertilizer.....	200	26	9 8	2100		
Without fertilizer.....		14 8	8	1350		
αNone-Such Manipulated Guano.....	200	23	10	1980		
Without fertilizer.....		23 8	7 8	1260		
DeLeon's Complete Cotton Fertilizer.....	200	21 4	7	1695		
Without fertilizer.....		13.	6 12	1185		
Raw Bone.....	200	22	7	1740		
Without fertilizer.....		12 4	6	1110		
αPacific Guano Co.'s Comp'd. Acid Phos.....	200	25	8	1980		
Without fertilizer.....		13	6 4	1155		
Chemicals and Cotton Seed.....	200	23 4	7 8	1845		
Without fertilizer.....		11 12	7 8	1155		
Zell's Acid Phosphate.....	200	24 8	8	1950		

EXPERIMENT OF MR. A. W. RHODES, HEPHZIBAH, RICHMOND COUNTY, GEORGIA.

Mr. Rhodes received from the Department samples of Piedmont Guano and Potomac Guano.

Soil.—Light sandy, eight years in cultivation. Original growth, oak and pine, with a little hickory.

Previous treatment.—The land has been cultivated in corn and cotton without fertilizer; has been cultivated by freedmen.

Preparation.—In March the soil was run off in three-foot rows, the land bedded with two furrows run with turn-plow, and the balk plowed out with turn-plow; length, thirty-five yards. These beds were opened May 24th, the fertilizers distributed and the seed, after being rolled in oak ashes, were sown on the guano and both covered with a board.

Cultivation.—June 23d, chopped. July 5th, plowed with buzzard plow. August 16th, hoed and plowed with same plow.

Seasons.—June was very dry and hot, and checked the growth of the plant. June 15th, light rain followed by hot sun, which scalded the plant. July 3d, 7th, 21st, 22d and 23d, rain—favorable. August 5th and 6th, rain—favorable. August 7th, cool east wind—unfavorable. August 25th, hard rain—favorable.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertili- zer applied per acre	1st Picking		2d Picking		Yield in Seed Cotton per Acre.
		Oct. 11.		Dec. 2.		
Wilcox, Gibbs and Co.'s Manipulated Guano.....	200	4	lbs. oz.	15	lbs. oz.	2660
Without fertilizer.....		1	8	3	8	700
αPiedmont Guano	200	7		7		1960
Without fertilizer.....		1	8	3	8	700
αPotomac Guano.	200	4		4		1120
Without fertilizer.....		1	8	3	8	700

EXPERIMENT OF MRS. J. W. BRYAN, DILLON, WALKER COUNTY, GEORGIA.

Mrs. Bryan received from the Department a sample of Vulcanite Guano No. 3, (for truck).

Soil.—Sandy loam with clay subsoil, five years in cultivation. Original growth chestnut, oak and hickory.

Previous treatment.—The land was planted in Irish potatoes in 1875 and 1876, peas for hay in 1877 and 1878, and in parsnips and beets in 1879; has had no fertilizers except ashes that have been applied around the pear trees, between which these crops were planted.

Preparation.—The land was carefully plowed and harrowed, seeds planted in drills thirty-five yards long and three feet apart.

Fertilizers were applied at the rate of 100 pounds per acre, for parsnips March 2d, and for turnips July 28th.

Planted parsnips in drills March 4th, and rutabaga turnips in drills July 28th.

Cultivation.—The *parsnips* were well up April 21st, hoed May 20th, plowed and hoed June 16th and August 8th. Stand not very good. *Turnips* were thinned and hoed August 8th, and plowed and hoed September 6th.

Seasons were very unfavorable for root crops—too much rain during the growing season.

Results.—Parsnips fertilized in the drill with Vulcanite Guano No. 3 (for truck), 100 pounds per acre, yielded 3,780 pounds; unfertilized, 2,730 pounds. Rutabaga turnips fertilized in drill with Vulcanite Guano No. 3 (for truck), 100 pounds per acre, yielded 2,100 pounds—stand very poor; unfertilized, yielded 1,190 pounds per acre.

Mrs. Bryan says: "Last year I applied DeLeon's Complete Fertilizer, 200 pounds compounded with 200 pounds land-plaster, to pearl millet, of which you have given report. On this same fertilized ground I sowed winter or fall oats, not adding any more fertilizer, and along side I sowed the same oats on ground which had not been fertilized, but was good ground. The oats on the last was completely frozen out, but that where DeLeon's Complete Fertilizer had been used was a complete success, and the *only* winter oats on Lookout mountain that I heard of which was not entirely winter killed. Now, I believe with this fertilizer we could make fall oats a certainty with us. The farmers here have generally abandoned fall sowing of oats, owing to the heavy freezes."

EXPERIMENT OF MR. B. F. O'KELLEY, PLANTER, MADISON COUNTY, GEORGIA.

Mr. O'Kelly received from the Department samples of Empire Guano, Piedmont Guano, and Navassa Acid Phosphate.

Soil—Sandy, with yellow clay subsoil; has been in cultivation twenty-two years. Original growth, pine, oak, hickory, black jack and chestnut. The test was made on a very thin plat of land.

Previous treatment.—The land has been rotated for several years in wheat, oats, corn and cotton. Within the last ten years commercial fertilizers have been used on it about three times. It was in corn in 1878, manured with compost in the hill. In 1879 it was in oats, without any fertilizer.

Preparation.—The plat was broken first week in March with ripper, (land hard and dry.) April 19th, laid off rows three-and-a-half feet wide and thirty-five yards long, with small shovel plow. April 23d, ran again in the same furrows with a larger shovel, and applied

Fertilizers at the rate of 200 pounds per acre, covered and bedded by running two furrows with ripper and two with turning plow.

The Acid Phosphate was composted according to the formulæ of the Department *Planting.*—April 28th, opened beds with small ripper and planted seed with cotton planter. Just before the cotton came up a small harrow was run over the rows. A good stand was secured.

Cultivation.—May 20th, sided with sweep and hoed. June 16th, plowed with

common shovel, four furrows to the row, and hoed second time. July 18th, plowed with sweep.

Seasons.—May 29th, and 30th light rains; June 8th, light rain; June 29th, light rain and very damaging hail; July 1st, light rain, then no more till August 6th. This has been the worst out of three bad crop years. Have had drouth, hail and rust. The latter injured the test plats unequally.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertilizer applied per Acre.	1st Picking	2d Picking	Yield in Seed Cotton per Acre.	
	lbs.	lbs. oz.	lbs. oz.	lbs.	
Cotton Seed and Stable Manure compost without Acid Phosphate.....	200	6 8	3	570	
α Empire Guano.....	200	7	2 8	570	
Without Manure.....		2 8	1 8	240	
Merryman's Ammoniated Dissolved Bone.....	200	6	2	430	Rusty.
Without Manure.....				330	"
α Piedmont Guano.....	200	6	2	430	"
Raves & Nickolson's Cotton Grower.....	200	5	1 8	390	"
α Navassa Acid Phosphate. Compost.....	200	3	1 8	270	"
Without Manure.....		2	2	240	

In reply to the following question: "Give the results of your experience and observation in regard to the use of commercial fertilizers and composts during the past few seasons," Mr. O'Kelley says:

"I am greatly perplexed on the subject. I have been using commercial fertilizers for a number of years, and am satisfied that they, when properly applied, greatly increase the yield of cotton; and have been of opinion that they were equally as good for corn crops. But my experience in the last few years has rather shaken my confidence in them for corn crops. It may have been on account of the dry seasons which we have had for the last three years. But there is one thing in connection with the subject that I cannot understand, which is, that, notwithstanding the boasted increase of the standard of the fertilizers which have been on the market within the last few years, none of it seems to yield like it did for the first few years after I commenced using it. But if you will suffer me to diverge a little, I would say that it is my opinion the use of commercial fertilizers has been a source of great damage to the Southern people, and that in many ways has the use of it by them enriched the balance of the world at their expense. If I had time and space I would try to show in what ways, or at least a few of them. But you ask me about my experience and observations concerning composts; and under this head I will say that, in my opinion, that is the only kind of manure it is to the interest of the farmers to use. And right here let me say that I do not believe it is at all necessary for us to use in them what are called the acid phosphates, and I am more settled in this conviction by the result of my crop tests this year, for you will see that my compost without any phosphate is equal with the highest standard fertilizer, and the best corn crop I ever made was manured with compost made from lot manure and cotton seed, put up in a heap in my

horse-lot; and the best wheat I ever made was manured with cotton seed with ashes mixed with them."

COMMENTS.—Mr. O'Kelley seems to have drawn some of his conclusions from single experiments. It is not safe to draw conclusions as to agricultural facts from such limited data. His experience and the results of his observations do not correspond with that of the mass of farmers of Georgia in reference to the use of acid phosphates in composts. As he suggests, the seasons materially affect the results of the use of fertilizers, especially those containing a large per cent. of actual ammonia or potential promptly convertible. The ammonia in the compost is potential and organic, and only gradually convertible, as the organic matter in which it exists as nitrogen is decomposed, and hence does not affect crops so injuriously in drouth as does ammonia in the commercial fertilizers.

EXPERIMENT OF MR. JAS. D. FREDERICK, MARSHALLVILLE, MACON COUNTY, GA.

Mr. Frederick received from the Department samples of Wilcox, Gibbs & Co.'s Manipulated Guano, Orient Complete Manure and Giant Guano.

Soil—light gravelly, with yellow clay subsoil; has been in constant cultivation 35 years; original growth, pine.

Previous treatment.—Planted in ground-peas in 1879. No fertilizers have been applied to the land for several years.

Preparation.—Furrows were opened April 16th with shovel, 35 yards long and 3 feet wide. Plat arranged as directed by the Department.

Fertilizers applied in shovel furrow, through a distributor, about four inches below the surface of the soil, at the rate of 200 lbs. per acre. Stable manure applied at the rate of 420 lbs. per acre.

Manner of planting and cultivation not reported.

Seasons.—There was very little rain from May 31st to August 2d. Effect unfavorable upon the crop.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st Picking	2d Picking	3d Picking	4th Picking	Yield in Seed Cotton per Acre.
		Aug. 18.	Aug. 28.	Sept. 22.	Oct. 15.	
		lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs.
Nothing.....		$\frac{1}{2}$	1	2 13 $\frac{1}{2}$	2 6	437 $\frac{1}{2}$
Popplein's Silicated Phosphate.....	200	1 13	2 12	3 4	10	590 $\frac{1}{2}$
Nothing.....		$\frac{1}{2}$	1 4	3 4	2 11	505 $\frac{1}{2}$
Stable Manure, first quality.....	420	1 5 $\frac{1}{2}$	2 15	3 12	13 $\frac{1}{2}$	621
Nothing.....		4 $\frac{1}{2}$	2 6	3 9	1 11	553
Acid Phosphate (Merryman's).....	200	2 8	3 12	3	11	695
Nothing.....		2	2	3 5	1 12	504
α Wilcox, Gibbs & Co.'s Manipulated Guano.....	200	4	3 8	2	7	695
Nothing.....		2	2	4 3	1 11	560
α Orient Complete Manure.....	200	3 9 $\frac{1}{2}$	4 10	3	9	822
Nothing.....		2 $\frac{1}{2}$	2 12	3 8	1 7	542
Merryman's (kind not stated).....	200	4 1	5	3	7	875
Nothing.....		2	1 9 $\frac{1}{2}$	2 12	2	455
α Giant Guano.....	200	4 4	3 5 $\frac{1}{2}$	1 9	3	654

The following experiments were tried by special request. The fertilizers named below were applied upon eight rows, each row one acre long, at the rate of 200 pounds per acre. The four middle rows in each plat were picked and carefully weighed with the following results:

NAME OF FERTILIZER.	lbs. of Fertilizer applied per Acre.		Yield in Seed Cotton per Acre.
		lbs.	lbs.
aOrient Complete Manure (four rows).....	200	31	507
Popplein's Silicated Phos. (four rows).....	200	35½	630
Merryman's Ammoniated Dissolved Bone (four rows).....	200	36½	638
aWilcox, Gibbs & Co.'s Manipulated Guano (four rows).....	200	39	680
aGiant Guano (four rows).....	200	35	612

Two hundred pounds each of Popplein's Silicated Phosphate and Merryman's Ammoniated Dissolved Bone were applied to an acre of land, 200 pounds of each per acre, both cultivated and picked alike, with the following results:

	Seed Cotton.	Lint Cotton.	Cotton Seed.
	lbs.	lbs.	lbs.
Merryman's Ammoniated Dis. Bone on one acre yielded.....	547	169½	371
Popplein's Silicated Phosphate on one acre yielded.....	536	177	349½

This is a valuable experiment, and shows the importance of comparing the results of fertilizers in the production of lint cotton, since the production of lint cotton is the object of cotton culture.

EXPERIMENT OF MR. W. H. ELLISON, SHILOH, TALBOT COUNTY GEORGIA.

Mr. Ellison received from the Department samples of State Grange Fertilizer and DeLeon's Complete Fertilizer.

Soil.—Dark mulatto, with clay subsoil; was cleared forty years ago. Original growth, oak, hickory, chestnut and poplar. The land had not been in cultivation for fifteen years, and had grown up in broom-sedge and pines.

Preparation.—The land was broken twice with small scooter; rows were opened with turn-scooter, three feet wide and thirty-five yards long, fertilizers applied and the land bedded April 20th.

Fertilizers were applied at the rate of 200 pounds per acre. The compost was prepared 1st January according to the formula published by the Department.

Planted April 21st with hand and covered with harrow.

Cultivation.—May 12th, hoed and chopped to a stand, leaving one stalk every ten or twelve inches. Plowed three times with scrape and hoed twice.

Seasons unfavorable—too wet in May, drouth in August, second crop destroyed by rain and cold.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER,	lbs. of Fertilizer applied per Acre.	1st Picking		2d Picking		3d Picking		4th Picking		Yield in Seed Cotton per Acre.
		Sept. 10.		Sept. 22		Oct. 15.		Dec. 8.		
		lbs.	lbs. oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	
aState Grange Fertilizer.....	200	11		4		7	8	2		857
State Grange Fertilizer.....	100	8	8	3		6		2		682
aDeLeon's Complete Fertilizer.....	200	12		5		6		1		840
DeLeon's Complete Fertilizer.....	100	7		4		5		3		665
Nothing.....		1		2		6	8	3	8	455
Chesapeake Guano.....	200	11	8	5		7		1	8	875
Chesapeake Guano.....	100	9		2	8	5		3	8	700
Bahama Guano.....	200	10	8	6		7	4	1		866
Bahama Guano.....	100	8		4		4	8	2	12	673
Nothing.....		1	4	1	8	6		3	8	463
Etiwan Compost.....	200	7		5		4		4	4	708

Mr. Ellison says: "My experience is that no fertilizer, either commercial or domestic, pays so well on corn or small grain as compost. I think that the compost is the most profitable fertilizer for the farmers of Georgia—its effect upon the soil is more permanent. All high grade guanos pay on my land when well broken and the seasons are favorable, but best on lands abounding in vegetable matter."

EXPERIMENT OF MR. CHARLES C. SHEPPARD, AMERICUS, SUMTER COUNTY, GEORGIA.

Mr. Sheppard received from the Department a sample of R. D. Coe's Original Soluble Bone Phosphate.

Soil.—Light gray with clay sub-soil; has been in cultivation thirty years or more. Original growth, long-leaf pine, mixed with post-oak and red-oak

Previous treatment.—Corn and cotton have been alternated on the land. A small quantity of fertilizer was used each year on cotton, and some cotton seed on the corn. Sometimes the plat was rested and grew up in weeds each third year.

Preparation.—The land was broken in January with a turn shovel. April 20th, laid off—rows 70 yards long, three feet wide, and bedded in the usual way.

Fertilizers were applied to plat No. 1 at the rate of 200 pounds per acre in the drill, April 20th, and bedded on. On plat No. 2, they were applied with the seed April 26th at the rate of 100 pounds per acre.

Planting.—April 26th the beds on plat No. 1 were opened with a small scooter, and the seed planted with Dow Law planter. On plat No 2, the fertilizers were applied at the rate of 100 pounds per acre in the opening furrow, and the seed then planted with Dow Law planter.

Cultivation.—May 17th, sided with scooter and scrape; 27th chopped out to one stalk; June 14th, sided with sweep; 24th hoed second time; 30th, ran one furrow with sweep; July 7th, hoed third time; 21st, sided with large sweep; 30th, ran one furrow with twenty-four-inch scrape.

Seasons were wet and cool up to the middle of June, succeeded by a long drought, which caused the cotton to shed. July and August were wet and the cotton put on a good middle and top crop.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight of each picking, the yield per acre resulting from the different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per Acre.		1st Picking		2d Picking		3d Picking		4th Picking		Yield in Seed Cotton per Acre.
	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	
<i>Plat No. 1.</i>											
a R.D.Coe's Original Bone Phos.....	200	206	95	140	75	100					516
Natural Soil.....		140	75	110		100					425
Giant Guano.....	200	207	99	142	75						523
Natural Soil.....		139	77	108	95						422
Hope Guano.....	200	207	97	145	78						529
Natural Soil.....		140	76	109	98						421
Baldwin & Co. Am'd Dis. Bone.....	200	213	110	146	80						547
Natural Soil.....		139	77	110	96						422
<i>Plat No. 2.</i>											
a R.D.Coe's Original Bone Phos.....	100	160	130	160	60						510
Natural Soil.....		140	76	111	90						427
Giant Guano.....	100	167	130	158	62						519
Natural Soil.....		139	77	120	89						425
Hope Guano.....	100	162	139	162	62						525
Natural Soil.....		140	76	118	91						425
Baldwin & Co. Am'd Dis. Bone.....	100	165	140	168	70						551
Natural Soil.....		139	78	120	90						425

Mr. Sheppard says: "After a careful observation of the use of commercial fertilizers for a number of years, I am clearly of the opinion that they increase the crop to a large per cent. I am also of the opinion that in the same ratio that the crop is increased, the price is decreased. Compost mixed with commercial fertilizers has proved satisfactory."

EXPERIMENT OF MR. E. B. HEARD, ELBERTON, ELBERT COUNTY, GEORGIA.

Mr. Heard received from the Department samples of Eutaw Fertilizer (Brown), Etiwan Dissolved Bone, and Giant Guano.

Soil—Dark porous upland, with stiff clay subsoil; supposed to have been in cultivation about thirty years. Original growth, hickory, red-oak, white-oak and post-oak.

Previous treatment.—The plat was sown in oats in 1878 and 1879 without fertilizer.

Preparation.—The land was broken in the spring with turn-shovel, and rows laid off with shovel, three feet wide and thirty-five yards long.

Fertilizers were applied April 27th in the shovel furrows at the rate of 200 pounds per acre, and the land bedded with turn-shovel. Compost was made by formula from the Department.

Planted seed with hand in small furrows opened in the beds 3d of May, and covered with board.

Cultivation.—May 15th, barred off with turn-plow; May 20th, chopped; June 2d, plowed with sweep, two furrows to the row; 11th, hoed and thinned to a stand; 29th, plowed with sweep, two furrows to the row; July 13th, hoed, and plowed with sweep, two furrows to the row.

Seasons.—May was dry and cool, unfavorable; June 1st to 15th, seasonable and favorable; from then till 1st of August, very little rain, hot and unfavorable. There was a good deal of rain in August, causing rapid growth and shedding; September fine for maturing the crop; killing frost last of October.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st	2d	3d	Yield in Seed Cotton per Acre.
		Picking Sept. 27.	Picking Nov. 5.	Picking Dec. 8.	
Chesapeake Guano.....	200	lbs. 350	lbs. 210	lbs. 105	lbs. 665
No Guano.....		140	140	70	350
Patapsco Guano.....	200	385	192½	105	682½
No Guano.....		175	140	87½	402½
αGiant Guano.....	200	245	210	70	525
No Guano.....		150	157½	87	395
αEutaw Fertilizer (Brown).....	200	350	175	87	612½
No Guano.....		175	140	105	420
αCompost with Etiwan Dissolved Bone.....	200	245	175	105	525
No Guano.....		175	140	87½	402½
αGiant Guano.....	200	280	210	122½	612½
No Guano.....		140	140	105	385

Mr. Heard says: "My experience with fertilizers for the last several years is that they pay a better per cent. than any other capital invested in farming, with proper cultivation, nine years out of ten; and that composts pay best when there is plenty of rain. After using commercial fertilizers for a number of years, and observing closely the results compared with crops without their use, I would under no circumstances attempt to raise a cotton crop without using them."

EXPERIMENT OF MR. W. A. ELDER, WATKINSVILLE, OCONEE COUNTY, GA.

Mr. Elder received from the Department samples of Wando Fertilizer and Dobb's Ammoniated cotton Fertilizer.

Soil—Rather gray sandy surface, with fine red clay subsoil; has been in cultivation one year; growth, old-field pine.

Previous treatment.—The land was cleared and put in cotton in 1879, with an application of 100 lbs. commercial fertilizer per acre. Stock wintered on the land until first of April.

Preparation.—It was broken closely with square-pointed scooter April 13th; laid off rows nearly East and West, 4 feet wide and 70 yds. long, with square-pointed

nine-inch scooter, and followed in the same furrow with a straight shovel. Applied the fertilizers in the shovel furrow, and bedded with one-horse Watt plow.

Fertilizers were applied at the rate of from 100 to 300 lbs. per acre. Compost was mixed in wagon-body at stable door, at the rates of 500 lbs. phosphate to the ton of stable manure.

Planting.—The beds were opened with short scooter, seed sown by hand on 23d of April, and covered with common one-horse harrow.

Cultivation.—"May 14th, not much more than half a stand up—looked very sorry; sided with square-pointed nine-inch scooter." May 18th, hoed and replanted; 26th, barred with Watt plow. June 9th, hoed to a stand, which was still bad; 18th, sided with scooter and scrape; 25th, ran 30-inch scrape in the middles. July 7th, chopped over with hoes, very dry and hot; 14th, sided with 20-inch scrape. August 1st, ran one furrow through the middles with 30-inch scrape.

Seasons.—April 29th, plenty of rain; no more until 5th of August, except a light shower 11th of July, which wet the ground about one inch. During this time the crop suffered severely with drouth and heat.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st Picking		2d Picking		3d Picking		Yield in Seed Cotton per Acre.
		Sept. 23.		Nov. 16		Dec. 11.		
		lbs.	oz.	lbs.	oz.	lbs.	oz.	
Whann's P. B. Raw Bone Superphos.....	200	10	2	21		2	6	737
αWando Fertilizer.....	200	11	3	18		1	8	675 2
αDobb's Ammoniated Cotton Fertilizer....	200	8	6	22		2	6	720 8
Georgia State Grange Fertilizer.....	200	8	8	15	8	2	13	590
Compost.....	200	9		16		2	1	595 6
Without fertilizer		3	13	15		1	9	448 4
Stable manure.....	400	7	8	16	8	2	8	580 4
Whann's P. B. Raw Bone Superphos.....	100	6	2	12	8		8	420 12
Whann's P. B. Raw Bone Superphos.....	300	15		15		1	2	680 12

EXPERIMENT OF MR. M. A. WOODS, MADISON, MORGAN CO., GA.

Mr. Woods received from the Department samples of Pacific Guano Co.'s Acid Phosphate and Eutaw Fertilizer (light brown).

Soil—Gray, gravelly, with yellow clay subsoil; has been cleared of second-growth pine six years; had been previously uncultivated forty years. Original growth, oak, chestnut and hickory.

Previous treatment.—Two years after clearing, the land made a bale of 450 lbs. cotton per acre; was next planted in corn, then in oats, and in 1878-9, was in corn manured lightly with compost in the hill.

Preparation.—It was broken February 10th with Syracuse chilled plow (one-horse), rows laid off three feet wide across the field, 200 yards long, and bedded with same plow that was used in breaking. Took 70 yards on the ends of the rows for the experiment.

Fertilizers were applied at the rate of 100 lbs. per acre in the row with the seed. Compost was applied in the same way at the rate of 200 lbs. per acre. The compost was made as follows: Two-fifths stable manure, two-fifths cotton seed, and one-fifth Pacific Guano Co.'s Acid Phosphate, all mixed wet and thrown into a heap and forked over until thoroughly fine.

Planting.—May 6th, opened the beds with small scooter, distributed fertilizers and seed and covered with thick board with small plows made of spring steel, bolted on ten inches apart.

Cultivation.—Sided with scooter, with old saw for board, and chopped to a stand June 10th. July 2d, plowed with scooter, and scrape bolted under heel of Haiman plow. July 3d, hoed; 30th, plowed with shovel and scrape. August 26th, laid by with scooter and scrape, and finished same day with hoes.

Seasons, from date of working, were favorable. "By reason of a baking rain soon after planting, not more than half a stand was had on the whole field; otherwise seasons were as favorable as could be required."

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs of Fertilizer applied per acre	1st Picking	2d Picking	3d Picking	4th Picking	Yield in Seed Cotton per Acre.
		Sept. 10.	Oct. 1	Oct. 27.	Dec. 14.	
Cumberland Superphos. of Lime	100	lbs. oz. 6 1	lbs. oz. 7 8	lbs. oz. 4 12	lbs. oz. 3 8	763
Natural soil.....		5	8 8	6	4 2	826
aPacific Guano Co.'s Acid Phosphate Compost.....	200	7	7 8	5 4	5	866
Natural soil.....		5 8	8 4	6 2	4 14	866
aEutaw Fertilizer.....	100	6 10	8 4	7 8	6 10	1015
Natural soil.....		5 14	9 12	7 4	6 10	1032

Mr. Woods says: "My experience with commercial fertilizers is, that they have not benefited cotton the past three years. One trouble has been, that I have planted too early and worked out to a stand, and it fruited before the hot dry weather in the latter part of June and July. The fruit maturing prevented a growth when rains came later, until first crop opened, and then too late. I account for difference in unfertilized rows of plat by reason, I think, of cotton rows striking on the corn rows of the previous year where it was manured and subsoiled to the depth of eight inches in the rows; but for the natural soil producing better than fertilized, I am unable to account, as the reasons given for failure in general crop did not operate in this case, for it was planted late and never suffered for anything."

EXPERIMENT OF MR. J. T. DENNIS, EATONTON, PUTNAM COUNTY, GEORGIA.

Mr. Dennis received from the Department samples of Crescent Bone, Georgia Chemical Works Acid Phosphate, Eutaw Fertilizer (deep black), and High Grade Nitro Phosphate.

Soil.—Mulatto; first year pine thicket land; has been 25 or 30 years since it has been in cultivation. Original growth, oak and hickory.

Preparation.—It was broken well twice with scooter; rows 35 yards long and 3½ feet wide. Plat arranged as directed in alternate sets of four rows fertilized and four unfertilized; gathered the two middle rows of each set.

Fertilizers were applied at the rate of 200 pounds per acre in the drill.

Planted April 7th in scooter furrow; sowed with hand, and covered with harrow.

Cultivation.—Plowed with turner the 15th of May, and hoed to a stand on 25th. Plowed with sweeps regularly every two weeks until July 15th; hoed twice.

Seasons favorable until about the first of June, then very dry until last of July, then rain enough. Crop would have been better with more rain in June and July.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight of each picking, the yield per acre resulting from the use of different fertilizers and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st Picking		2d Picking		3d Picking		Yield in Seed Cotton per Acre.
		lbs.	oz.	lbs.	oz.	lbs.	oz.	
Nothing.....		3	8	3	4	2	12	525
Georgia Chemical Works Acid Phosphate.....	200	4	4	2	8	2	4	630
Nothing.....		3	12	3		2	12	525
Patapseo Guano.....	200	5	12	3	8	2	12	840
Nothing.....		2	4	2	8	2		455
Eutaw Fertilizer (deep black)	200	7		3	8	2	8	910
Nothing.....		2	8	2	12	1	12	490
Mapes' High Grade Nitro-Phosphate.....	200	5	4	3	12	2	8	805
Nothing.....		3	8	2	8	1	12	525
Russell Coe's.	200	4	12	2	8	2	12	700
Nothing.....		1	4	2	4	2	4	402
Mapes' High Grade Nitro-Phosphate.....	200	3	4	3	8	3	4	700
Nothing.....		1		2	8	2	4	402
Crescent Bone.....	200	3	4	2	8	4	4	700
Nothing.....		1	4	2	4	2	4	402

Mr. Dennis says: "Guano has paid me every year, but not so well this year as usual, on account of excessive drouth followed by too much rain. I use compost mostly in my crop, and think it pays better than guano."

EXPERIMENT OF MR. J. H. CARSWELL, HEPHZIBAH, BURKE COUNTY, GEORGIA.

Mr. Carswell received from the Department samples of Alta Ammoniated Guano and Dobb's Ammoniated Cotton Fertilizer.

Soil.—Sandy with some gravel from the size of a pea down. Subsoil yellow clay; has been in cultivation about 40 years. Original growth, oak and long-leaf pine, about half of each.

Previous Treatment.—It was in corn in 1875-6 without any fertilizer; laid out in 1877. In 1878 planted in corn with 20 bushels compost of cotton seed and stable manure per acre. In the fall of 1878 sown in oats without fertilizer. Nothing was planted in 1879 after cutting the oats.

Preparation.—Bedded the land in January with one-horse turn plow in rows 3 feet wide and 35 yards long.

Fertilizers were applied by hand April 19th at the rate of 100 and 200 pounds per acre. Composts were made in several ways and applied in different quantities per acre.

Barry's Acid Phosphate was composted with cotton seed and stable manure in three different preparations, viz: 100 pounds Phosphate to 100 pounds seed and manure mixed; 100 pounds Phosphate to 200 pounds seed and manure mixed; and 100 pounds Phosphate to 300 pounds seed and manure mixed. The cotton seed were put into the stable and trod by the horses until killed but not rotted. The seed and manure were raked up together, mixed with the Phosphate, and applied at once. The seed and manure were not weighed (being quite damp), but one bushel was counted at 30 pounds. The hen manure and Phosphate were mixed dry by rubbing with a hoe, 100 pounds Phosphate to 200 pounds of hen manure and 133 pounds of dry unleached ashes.

Alta Ammoniated Guano applied May 17th. It was received too late to be applied with the other brands.

Planted the 25th of April in furrows opened with small scooter; seed sown and covered with a planter. That where Alta Ammoniated Guano was used was planted May 17th.

Cultivation.—May 15th sided with sweep; 26th chopped to a stand of one to two stalks to the hill. June 4th chopped the Alta plat and plowed it first time, and all the rest second time, with sweeps, two furrows to the row. June 23d plowed Alta plat second time and the rest third time with sweep, two furrows to the row. July 19th plowed Alta plat third time and the rest fourth time, two sweep furrows to the row. No regular hoeing was needed after chopping out; walked over twice and chopped out bunches of grass.

Seasons.—There was plenty of rain to 15th of May. Cold rain on the cotton while it was coming up seemed to check its growth. Only two inches of rain fell between the 15th of May and 21st of July—not enough at any one time to bring up grass. After the 21st of July, there was plenty of rain during the growing season.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertili- zer applied per acre	1st Picking		2d Picking		Yield in Seed Cotton per Acre.
		Sept. 28.		Dec. 16.		
		lbs.	oz.	lbs.	oz.	
<i>α</i> Alta Ammoniated Guano.....	200	7	2	3	6	735
<i>α</i> Alta Ammoniated Guano.....	100	5	10	3	14	665
Natural soil.....		1	6	4	6	402½
<i>α</i> Dobb's Ammoniated Cotton Fertilizer.....	200	8	8	1		665
<i>α</i> Dobb's Ammoniated Cotton Fertilizer.....	100	6	6	1	2	525
Natural soil.....		4	14	1	10	455
Barry s Acid Phosphate, 100 lbs., and 100 lbs. seed and manure.....	200	7	4		8	542½
Barry's Acid Phosphate, 100 lbs., and 200 lbs., seed and manure.....	300	9	8		10	70¾
Natural soil.....		3	14	1	14	40¾
Barry's Acid Phos., 100 lbs., and 300 lbs. seed and manure.....	400	8	4		14	608¾
Barry's Acid Phos., 100 lbs. to 300, etc., but half quantity per H..	200	6	2	1		498¾
Natural soil.....		3	8	1	8	350
Barry Acid Phos., 100 lbs., hen manure 200 lbs., ashes 133 lbs.....	433	5	10	2	4	551¼
Barry's Acid Phos., 100 lbs., hen manure 200 lbs.....	800	5	8	1		455
Natural soil.....		2	8	1	8	280
Hen manure alone.....	300	4	6	1		376½

Mr. Carswell says: "I applied compost of Barry's Acid Phosphate, cotton seed and stable manure to my whole watermelon patch. After the patches of every one of my neighbors who left out the phosphate (so far as I know) had completely failed, I still had plenty of large melons, both ripe and green. Drouth seemed to ruin theirs, but did not appear to injure mine. I observed similar results last year on different parts of my own patch."

EXPERIMENT OF MR. JOHN T. WINGFIELD, WASHINGTON, WILKES COUNTY, GA.

Mr. Wingfield received from the Department samples of Baugh's Raw Bone, Super-Phosphate of Lime, Dixie Phosphate, L. & R. Ammoniated Soluble Phosphate, Empire Guano and Gossypium Phospho.

Soil—Rather light and thin, with clay subsoil; has probably been in cultivation eighty years. Original growth, white-oak, post-oak, red-oak and hickory.

Previous Treatment.—It was in cotton in 1878-9, in grain in 1877. The same plat was used for experimenting in 1878, but the rows cross the previous planting.

Preparation.—In January last the old stalks were turned under with a two-horse plow; after heavy rains, crossed with double shovel; after another heavy rain, and immediately before planting, harrowed. Rows 70 yards long and 3½ feet wide.

Fertilizers were applied May 6th, at the rate of 210 lbs. per acre, in small scooter furrow.

Planted, May 6th, in above furrows, and covered with forked plow. No stand was secured until about the 24th.

Cultivation.—May 27th, ran one cultivator furrow to the row. June 10th, hoed to a stand; 20th, ran two solid sweep furrows to the row. July 1st, ran one big sweep furrow to the row; 14th, hoed; after which, the weather was so dry that no more work was needed to keep the crop clean.

Seasons.—Gentle rain May 30th; July 9th, the best shower since May 30th; August 3d, good rain, the first since May 30th. After that, seasonable, or rather too much rain, with disastrous effects.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs of Fertilizer applied per acre	1st Picking	2d Picking	3d Picking	Yield in Seed Cotton per Acre.
		Oct. 2.	Oct. 26.	Dec. 13.	
Natural soil.....		lbs. oz.	lbs. oz.	lbs. oz.	lbs.
Baugh's Raw Bone Superphos. of Lime.....	210	6	.....	2 8	255
aDixie Phosphate.....	210	9	.....	1 4	307½
aEmpire Guano.....	210	7 8	5 8	1 8	435
aGos-ypium Phospho.....	210	8 8	5 6	2	476
aL. and R. Ammoniated Sol. Phosphate...	210	9 8	6	1 4	502½
		8 8	.....	1 2	288

Experiment ruined by Nos. 1, 2 and 5 being picked by carelessness of hands a few days before second picking of plat, though every precaution was taken to guard against it.

EXPERIMENT OF MR. E. TAYLOR, BOLINGBROKE, MONROE CO., GA.

Printup's Shell Lime and Baugh's Raw Bone Super-Phosphate of Lime were assigned to Mr. Taylor, but he reports, instead of Baugh's, "Whann's Dissolved Bones."

Soil—Gray and gravelly, with mulatto subsoil. Original growth, oak and hickory; regarded as exhausted and turned out in 1847. In 1859 it was refenced, and has since been used as a "truck patch."

Previous treatment.—The plat has been cultivated in melons, squashes, corn, rice, etc. Stable manure, compost of land plaster, wood's mould, salt and lime and commercial fertilizers, have been applied to the patch while used as a "truck patch."

Preparation.—It was broken with Haiman turn-plow February 21st, and cross-plowed April 22d. Furrows were opened with scooter, fertilizers distributed at the rate of 200 lbs. per acre, and cotton planted April 26th. Plat arranged as directed.

Fertilizers were applied at the rate of 200 lbs. per acre. In addition to the commercial fertilizers used, the "Home Fertilizer" (Boykin, Cramer & Co.)—composed of 20 bushels wood's mould, 3 bushels ashes, 3 bushels dissolved animal bone, 3 bushels plaster, 40 lbs. nitrate of soda, 40 lbs. sulphate of soda, and 33 lbs. sulphate of ammonia—was used at the rate of 200 lbs. per acre.

Planted April 26th in scooter furrow, and covered with harrow with two teeth.

Cultivation.—Sided May 14th with 12-inch sweep; chopped out May 20th; plowed out the middles with 14-inch sweep June 10th; 22d, hoed second time; July 22d, laid by with 18 inch sweep, and hoed.

Seasons, mainly favorable as to rainfall and temperature.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs of Fertilizer applied per Acre.	1st	2d	3d	4th	Yield in Seed Cotton per Acre.
		Picking	Picking	Picking	Picking	
		Sept. 6	Sept. 18	Oct. 12	D c. 4.	
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Unmanured.....		350	410	453	87	1300
Home Fertilizer.....	200	420	455	530	150	1555
Whann's Dissolved Bone.....	200	430	510	565	172	1677
αPintup's Shell Lime.....	200	367	430	620	115	1532

Mr. Taylor says: "I have used fertilizers for several seasons, and think they have paid me in early growth of weed and early maturity of the crops, if in nothing else."

EXPERIMENT OF MR. W. P. EDMONDSON, LAGRANGE, TROUP COUNTY, GA.

Mr. Edmondson received from the Department samples of Wilcox, Gibbs & Co.'s Manipulated Guano, Eureka Ammoniated Bone Super-Phosphate of Lime, and Stern's Ammoniated Super-Phosphate.

Soil, close, stiff and red; has been in cultivation about 30 years; was in cotton in 1879.

Preparation.—April 15th, opened the old rows and listed on them. Rows 35 yds. long and 3 feet wide. The lists were re-opened and the

Fertilizers distributed at the rate of 200 lbs. per acre. April 15th, the land was bedded with scooter.

Planted April 20th in small furrow opened in the beds, sowed the seed and covered with a cotton planter.

Cultivation.—May 15th, sided; 25th, reduced to a stand; 12th, plowed; 25th, hoed, and July 2d plowed last time.

Seasons, good average.

TABULAR STATEMENT.

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st	2d	3d	Yield in seed Cotton per Acre.
		Picking	Picking	Picking	
		Sept. 15.	Oct. 12.	Nov. 7.	
		lbs.	lbs.	lbs.	lbs.
αWilcox, Gibbs & Co.'s Manipulated Guano.	200	10	9	4	1610
αEureka Am'd Bone Superphos. of Lime...	200	9	8	4	1470
αStern's Am'd Bone Superphos.....	200	9	10	4	1610
Without fertilizer.....		3	7	5	1050

EXPERIMENT OF MR. C. W. SPROULL, ROME, FLOYD COUNTY, GA.

Mr. Sproull received from the Department a sample of Bale's Guano.

Soil, chocolate loam; has been in cultivation ten years. Original growth, post-oak, hickory, pine and walnut.

Previous treatment.—The plat was planted in oats in the fall of 1878, the stubble turned under in the summer of 1879, and planted in peas; the vines were taken off in the fall for hay. Previous to that the land was planted in turnips, manured with acid phosphate.

Preparation.—Opened furrows with a common plain shovel, distributed the fertilizers and bedded with one-horse turn shovel. Rows 35 yards long and three feet wide.

Fertilizers applied as shown in the tabular statement.

Planted 2d of May in the usual manner.

Cultivation.—Sided May 28th with scooter and board. July 21, chopped to two or three stalks to the hill; 25th, put to a stand of one and two stalks, after siding with shovel and board. Subsequent cultivation done with sweep.

Seasons, "in the main, were favorable."

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertili- zer applied per acre	1st	2d	Yield in Seed Cotton per Acre.
		Picking	Picking	
		Oct. 1.	Dec. 15.	
Compost	500	lbs. 9	lbs. 13	lbs. 1540
Nothing		5	15	1400
a Bale's Guano.....	280	10	16	1820
Compost.....	1000	13	12	1750
Compost.....	300	13	11	1680
Compost, 300 lbs.; Bales' Guano, 50 lbs.....	350	12	10	1540

EXPERIMENT OF MR. W. A. SPEER, McDONOUGH, HENRY COUNTY, GEORGIA. •

Mr. Speer received from the Department samples of None-such Manipulated Guano, Ober's Soluble Superphosphate of Lime, and Wright & Co.'s Solid Guano.

Soil red and thirsty, with good clay subsoil. Has been in cultivation four years. Original growth, oak, hickory and pine.

Previous treatment.—It was planted in corn the first year without guano; second year, in cotton, with 150 lbs. guano per acre; third and fourth years, in cotton, with a generous application of commercial fertilizers.

Preparation.—In January the old cotton stalks were knocked down and the land thoroughly broken about six inches deep with long half turners. March 25th, laid off rows 70 yards long and three feet wide, with long shovel plow, and bedded with common turn plow.

Fertilizers, used without composting, were applied at different rates per acre, March 25th, by hand, as shown in the tabular statement.

Compost was made of one-third leaf mould, one-third cotton seed, one-sixth Ober's Soluble Superphosphate, and one-sixth salt. This lay three weeks after being mixed, and was then hauled out and applied directly from the wagon.

Planted April 10th. Opened beds with small scooter. Planted with cotton planter, putting thirty pounds of Ober's Soluble Superphosphate per acre with the seed used for planting; green seed mixed with common variety in equal quantities.

Cultivation.—May 3d, harrowed with common six-tooth harrow. May 10th, plowed with double stock; 30th, plowed with double stock, with small scooter on front foot and shovel behind. June 15th, plowed again with shovel. June 28th, plowed, and July 12th, plowed with scrape and short scooter.

Seasons.—Heavy rains April 13th. The seasons from May to June 10th were good; very heavy rains about June 5th and 10th; dry from June 10th to 25th; good rains July 16th; dry from then till August 4th. The cool nights in July and the low temperature in August suited vegetation. The heat was never great or excessive.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st Picking		2d Picking		3d Picking		4th Picking		Yield in Seed Cotton per Acre.
		Sept. 5.		Sept. 25.		Oct. 12.		Nov. 20.		
<i>a</i> Russell Coe's Am'd Bone Sup. Phos.	100	lbs. 17	oz. 8	lbs. 20	oz. 6	lbs. 20	oz. 15	lbs. 11	oz. 14	1180
Merryman's Am'd Dissolved Bone..	100	9	11	25	3	10	4	11	13	1184
Without Fertilizers		1	4	3	4	2	4	5	8	690
<i>a</i> Ober's Soluble Superphos. Lime.....	125	25		28		16	12	8	12	1335
Compost.	800	14		26	12	29	6	13	3	1440
Baldwin's Am'd Dissolved Bone...	125	12	8	24		26	7	10		1290
Without Fertilizer.. ..		6	4	12	3	13	4	5		630
Compost.....	1000	18	10	35	9	28	6	15	4	1670

TABULAR STATEMENT

Of Corn and Fodder produced per acre.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	Bushels of Corn per acre	Lbs. of Fodder per acre	Date of Planting.	Date of Maturity.
<i>a</i> Ober's Soluble Superphos. Lime.....	150	20	200	M'ch 20	Oct. 15
<i>a</i> Wright & Co.'s Solid Guano.....	150	12	150	" "	" "
National Am'd Dissolved Bone.....	150	21	204	" "	" "
<i>a</i> None-such Manipulated Guano.....	110	20	200	" "	" "
Without fertilizer.....		12	150	" "	" "
Orient Complete Manure	150	15	175	" "	" "
Compost	500	25	250	" "	" "

Mr. Speer says: In the years 1878 and 1879, neither commercial guanos nor compost benefitted us much, on account of dry weather; this year, it having been cool and seasonable, commercial guanos and compost have paid well. My preference

being for compost on account of its being more durable, compost made after this formula: 750 pounds leaf mould, 500 pounds cotton seed; 400 pounds stable manure, 300 pounds commercial guanos, 50 pounds salt, is far better than any commercial guano used alone, if the compost is applied at the rate of 650 pounds per acre on cotton. The land is not impoverished on this plan as with most commercial guanos.

EXPERIMENT OF MR. WM. M. BROWNE, PROF. OF AGRICULTURE IN THE STATE COLLEGE AT ATHENS, CLARKE COUNTY, GEORGIA.

Prof. Browne received from the Department samples of Bradley's Patent Superphosphate of Lime, Baldwin and Co.'s Ammoniated Dissolved Bone, Lowe's Georgia Formula, Vulcanite Guano No 2. (for cotton), Ober's Soluble Superphosphate of Lime, and Sterling Guano.

Soil—Thin gray surface with red clay subsoil. Not cultivated for thirty years. Original growth, pine and oak.

Preparation. The land was thoroughly plowed in January with Lester's two-horse subsoil plow. Cross-plowed with the same plow in February. Bedded in March with one-horse Brinly turn-plow. The plat is almost perfectly level. It was laid off in thirty-nine sets of thirteen rows each, three feet apart; each set contained exactly one-quarter acre.

Fertilizers were applied at the rate of 200 lbs. per acre, with Dow-Law planter, April 12, 13 and 14. Compost was prepared according to the formula published by the Department, and applied at the rate of 600 lbs. per acre.

Planted, April 15th and following days, with Dow-Law planter (opening, dropping and covering the seed at one operation), at the rate of one bushel of seed (rolled in ashes) to the acre.

Cultivation.—May 1st, sided with Lester subsoiler; 11th, hoed and chopped out; 15th, plowed out the middles with shovel; 18th, hoed to a stand. June 7th, plowed with Dixon sweep; 14th, hoed; 24th, swept. July 5th, hoed; and July 15th, swept and laid by.

Seasons, prior to September, favorable. The drouth in June seemed to do no injury, owing to the deep preparation of the soil and early deep working of the crop. Continued rains in October and November caused most of the top crop to rot, cutting off the yield probably one-third.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertilizer ap- plied pr Acre	1st Picking		2d Picking		3d Picking		4th Picking		Yield in Seed Cotton per Acre.
		Aug. 30.		Sept. 15.		Sept 30		Oct. 21.		
		lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	
Etiwan Guano	200	47		77	14	86	8	82	12	1193½
Patapsee Guano.....	200	45		74	6	76	8	79	12	1102½
Etiwan Crop Food.....	200	71	2	67	2	47	2	63	2	994
Mastodon Am'd Superphosphate.....	200	72	8	88	10	63	4	74	11	1196
αBradley's Am'd Dissolved Bone....	200	81	3	69	8	64	4	68	10	1134
Grange Mixture.....	200	70	6	54	7	47	9	75	4	990½
αBaldwin & Co.'s Am'd Dis. Bone....	200	67	5	61	15	56		82	5	1070½
Monarch Guano.....	200	63	5	44	1	55	14	79	14	972½
Georgia State Grange Fertilizer.....	200	71	4	64	12	69	9	29	4	939½
αLowe's Georgia Formula.....	200	62	4	47	12	60	4	27	8	791
Cumberland Superposphate.....	200	40	6	43	15	63	12	31	12	719½
αSterling Guano.....	200	40	6	44	11	54	8	32		686½
DeLeon's Complete Cotton Fertilizer	200	41	14	40	4	63	4	30	1	701½
αVulcanite Guano No. 2 (for cotton)	200	19	12	26		56	4	31	8	534
Gossypium Phospho.....	200	62	5	69	2	74		34		953½
Pomona Guano.....	200	66	13	46	12	87	14	54		1022¾
Orient Complete Manure.....	200	44	1	56	12	65	3	29	4	781
αOber & Son's Superphos. of Lime..	200	62	3	54	6	58		23	4	791½
Compost—Cotton seed, stable ma- nure and Acid Phosphate.....	600	71	14	60	4	66	8	51	14	1002
*Non-fertilized rows (average)		6	12	10	12	14		42		294

*The non-fertilized rows between each set of those fertilized as above, yielded nearly precisely the same amount of seed cotton. I have, therefore only given the average.

Prof. Browne says: "My experiments with wheat as to variety of seed, quantity of seed per acre, drilled or broad-cast, depth of planting, comparative value of fertilizers, etc., were all frustrated by the rapid ravages of rust in May.

"*Experiments with oats.*—As to time of planting, one acre well prepared, liberally fertilized, sown with rust-proof seed September 13th, covered with harrow and cut June 9th, yielded 28 bushels. One acre adjoining, similarly treated, sown November 12th, and cut June 14th, yielded 31 bushels. One acre sown January 20, and cut June 22d, yielded 22 bushels. Half acre sown November 12th, top dressed February 18th with 40 lbs. nitrate of soda, and cut June 15th, yielded 22 bushels, or at the rate of 44 bushels per acre. The natural soil was very thin."

In answer to the following: "Give the results of your experience and observations in regard to the use of commercial fertilizers and composts during the past few seasons," Prof. Browne says:

"I repeat with renewed confidence my remark under this head last year, namely, that no farmer can afford to do without fertilizers. The influence of those brands containing a high per centage of phosphoric acid, in the early maturity of the crop, is fully equal in value to their action in increasing the yield. I am inclined to believe that if manufacturers would increase the per cent. of phosphoric acid and diminish the ammonia, their fertilizers would be improved."

EXPERIMENT OF MR. J. M. DILL, CLAY HILL, LINCOLN CO., GA.

Mr. Dill received from the Department samples of Georgia Chemical Works Acid Phosphate and Mastodon Ammoniated Soluble Phosphate.

Soil.—Sandy loam; has been in cultivation sixty years. Original growth, oak and hickory.

Previous treatment.—The plat was cultivated in potatoes in 1879, and manured lightly with cotton seed and stable manure compost. It was in corn and peas in 1878, manured with compost.

Preparation.—Bedded with turn-plow the latter part of March. Rows three feet wide and seventy yards long. April 28th, opened the middle furrows with 12-inch shovel and applied the

Fertilizers at the rate of 200 lbs., and compost at the rate of 400 lbs., per acre. The compost was made according to the formula of the Department.

Planted in small furrow opened in the bed May 4th, and covered with horse-rake. Good stand up on the 12th of May.

Cultivation.—May 30th, barred off with turn-plow. June 14th, chopped to a stand; 16th, plowed with 20-inch sweep, running twice to the row. July 5th, ran two furrows to the row with 20-inch sweep; 10th, chopped through with hoes.

Seasons were favorable until the 15th of June; had no rain then for seven weeks. August was too wet, causing too great development of weed. First killing frost, October 23d, but most of the cotton was matured and opened at that time.

TABULAR STATEMENT

Of Cotton produced, in which are given the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertilizer applied per acre.	Yield in Seed Cotton per acre.
	Lbs.	Lbs.
Without Fertilizer.....		630
High grade Nitro Phosphate.....	200	1155
Without Fertilizer.....		665
Sea-Fowl Guano.....	200	1295
Without Fertilizer.....		577
Mastodon Am. Super-Phosphate.....	200	1172
Without Fertilizer.....		752
Compost.....	400	1085
Without Fertilizer.....		647

Mr. Dill says: "I believe that commercial fertilizers, applied economically, will pay; but my experience is, that a compost of stable manure and cotton seed, with a good acid phosphate, composted by the formula of the Agricultural Department of the State, is the cheapest and best fertilizer that can be used."

EXPERIMENT OF CAPT. F. D. WIMBERLY, BULLARD'S, TWIGGS COUNTY, GA.

Capt. Wimberly received from the Department samples of Colgate Manure and Vulcanite Guano No. 2 (for cotton).

Soil, red; has been in cultivation about sixty years. Original growth, oak, hickory, pine and walnut.

Previous treatment.—The plat was planted in corn in 1879, and in oats the two years preceding. Very little manure has ever been used on the plat except cotton seed when the land was planted in corn.

Preparation.—The land was broken early in January with a two-horse Reese plow, and the rows laid off exactly three feet wide and 140 yards long with a good shovel. In these furrows

Fertilizers were distributed through a trumpet at the rate of 200 lbs. per acre, and the land bedded with turn plow.

Planted early in May in small scooter furrows, sowing seed by hand and covering with a board. A stand was secured in a few days.

Cultivation.—May 25th, plowed with double stock, using two small scooters on each foot. June 1st, chopped to nearly a stand; 8th, plowed second time with solid sweep; 29th, hoed and put to a stand; July 7th, ran round with sweep August 2d, sided with sweep and laid by.

Seasons.—There was no rain after planting until June 24th, when there was a light shower; then no more rain until July 25th, when a light shower fell. August 1st, there was a good rain, and too much from that time forward, causing very rapid growth and heavy fruitage, but too late to mature.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER	Lbs. of Fertilizer applied per acre	1st Picking	2d Picking	3d Picking	Yield in Seed Cotton per Acre.
		Sept. 20.	Oct. 15.	Dec. 20.	
α Colgate's Complete Manure.....	200	14	14 8	6 8	595
Natural soil		10	11	5	450
α Vulcanite Guano No. 2 (for cotton).....	200	16	14	6	630
Natural soil.....		10	12	6 8	480
Whann's Plow Brand.....	200	15	14	5	590

Capt. Wimberly says: For the past few seasons the use of commercial fertilizers has not paid me; but I attribute it to the very dry summers I have had for the last two years, and having my crop almost entirely destroyed by hail three years ago.

EXPERIMENT OF MR. E. S. WELLONS, PERRY, HOUSTON COUNTY, GEORGIA.

Mr. Wellons received from the Department samples Eutaw Fertilizer (deep black) and Ober's Dissolved Bone Phosphate, S. C. •

Soil gray and rather sandy with good red clay subsoil. Has been in cultivation forty or fifty years. Original growth, oak and pine, the latter largely predominating.

Previous treatment.—The land was planted in cotton in 1877 without fertilizer; in corn in 1878, manured with cotton seed two bushels per acre; was sown in wheat in the fall of 1878, with fifteen or twenty bushels cotton seed per acre.

Preparation.—The stubble was turned over with a Dixie Plow February 5th, rows seventy yards long and three feet wide.

Fertilizers were applied at the rate of 200 pounds per acre. Composts were made according to the formula of the Department. These were applied in deep furrows and bedded on April 19th.

Planted April 19th in small scooter furrows made in the top of the beds, and covered with board.

Cultivation.—May 6th, chopped to a stand ahead of the plow; 19th, sided with sweep; 27th, hoed; June 12th, plowed with sweep; July 7th, hoed and plowed with sweep; July 21st, plowed with sweep.

Seasons were very good until June 1st, when a drouth of seven weeks ensued. It was followed by rather too much rain, causing the cotton to shed and the bollworm to injure it somewhat. Altogether I do not regard the season as favorable for cotton on gray land.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st Picking		2d Picking		3d Picking		Yield in Seed Cotton per Acre.
		Sept. 1.		Sept. 26.		Nov. 11.		
		lbs.	oz.	lbs.	oz.	lbs.	oz.	
Gossypium Phospho	200	12		4		7		805
Not manured.....		4	8	3		7		507
Whann's Raw Bone Superphosphate.....	200	9		3		6		630
Not manured.....		3	12	2	8	6		429
αEutaw Fertilizer (deep black).....	200	12		5		7		840
Not manured.....		4		3		7		490
αOber's Dissolved Bone Compost.....	400	10	8	6		6		787
Not manured.....		3	12	2		5		376
Patapsco Acid Phosphate Compost.....	400	10	8	4		7		752
Without fertilizer.....								429
Wando Fertilizer Compost.....	400	9		4		8		735
Without fertilizer.....								402

Mr. Wellons says: "My experience, and observation, also, teach me that good guano uniformly pays; and my observation the present season, in several instances, convinces me that sometimes it pays to use commercial fertilizers very heavily, particularly acid phosphate composted with stable manure and cotton seed.

EXPERIMENT OF MR. WM. A. TURNER, NEWNAN, COWETA COUNTY, GEORGIA.

Mr. Turner received from the Department samples of Bradley's Patent Superphosphate and L. & R. Ammoniated Soluble Phosphate.

Soil gravelly, with good clay sub-soil. Has been in cultivation five or six years. Original growth oak, red and post, hickory, pine and chestnut.

Previous treatment—The land has been cultivated in corn and cotton; was manured with compost of cotton seed, stable manure and Acid Phosphate in 1879.

Preparation. The land was broken with one-horse turn shovel, subsoiled with narrow scooter in the rows, manures put in and bedded on with turn shovels—rows thirty-six inches wide and seventy yards long.

Fertilizers (commercial) were applied at the rate of 200 pounds per acre, other manures 400 pounds per acre. Compost made according to the formula of the Department.

Planted May 1st. Beds opened with small scooter. Seed sown by hand and covered with double plow.

Cultivation. May 28th, sided with small scooter and board. June 8th, plowed with scooter and scrape. June 28th, plowed with short shovel and scrape. July 16th, plowed with shovel and scrape, and again with the same plow August 6th. Hoed after each of the first three plowings, and chopped through last of July.

Seasons. Too wet till middle of June, interrupting cultivation. Temperature favorable up to that time. After that there was rain enough to the middle of July, when a drouth commenced causing a loss of most of the fruit except the July crop. Cotton grew very well till August, after which there was but little growth till the first of September.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER. (Four rows to each all picked.)	Lbs. of Fertilizer applied per acre	1st Picking		2d Picking		3d Picking		4th Picking		5th Picking		Yield in Seed Cotton per Acre.
		Sept. 2.	Sept. 2.	Sept. 2.	Sept. 2.	Oct. 4	Oct. 26.	Oct. 26.	Oct. 26.	Dec. 8.	Dec. 8.	
aBradley's Patent Superphos....	200	15 6	37 6	18	oz.	9 6	1 6	1452½				
Without Fertilizer.....		6	21	10	8	9	1 8	840				
aL. & N Am'd Sol. Phosphate..	200	14	24 8	13		7	1 8	1050				
Without Fertilizer.....		10	31 8	15		7 8	1	1120				
Acid Phosphate.....	200	7	23 8	12		7 12	12	892½				
Without Fertilizer.....		4 10	20 8	13		8 6	1	848½				
King Guano.....	200	14	40	19 8		6 8	1	1417½				
Without Fertilizer.....		6 2	24 14	16 9		11 7	2 8	1076½				
Atlantic.....	200	17	46 8	21 8		7 8	1 4	1640				
Without Fertilizer.....		6 6	22 2	12 8		7	1	857½				
Zell's Economiz r.....	200	11	26	12 4		6	1 12	997½				
Without Fertilizer.....		1 9	15 2	12		9 5	1 8	691½				
Compost, stable manure, cotton seed and acid phosphate.....	400	16 5	41 5	15 6		7 8	1 12	1439½				
Without Fertilizer.....		1 5	11 11	7 5		7 5	3 6	542½				

EXPERIMENT OF MR. J. C. BREWER, ANTIOCH, HEARD COUNTY, GEORGIA.

Soil, clay; original growth, oak, hickory and pine. Cleared in 1864. Planted in corn last year. Owing to sickness in Mr. Brewer's family, he did not keep the usual records of preparation, cultivation, etc.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	Lbs. of Fertilizer applied per acre	1st Picking	2d Picking	3d Picking	4th Picking	Yield in Seed Cotton per Acre.
<i>a</i> Bradley Patent Superphosphate.....	200	490	684	490	289	1945
Pomplein's Silicated Phosphate.....	200	459	781	457	293	1989
Without Fertilizer.....		177½	390	490	320	1477½
Peruvian Guano No. 1.....	200	420	840	490	270	2020
<i>a</i> Experiment.....	200	468	630	528	347	1973
Without Fertilizer.....		178	420	420	430	1438
Excellenza.....	200	452	670	501	351	1974
Baldwin & Co.....	200	471	652	521	362	2006
Without Fertilizer.....		187	430	429	438	1489
Georgia State Guano.....	200	479	661	518	341	1999
Pomona Guano.....	200	461	672	507	301	1941
Without Fertilizer.....		191	437	431	439	1508

EXPERIMENT OF MR. S. P. ODOM, DRAYTON, DOOLY COUNTY, GEORGIA.

Mr. Odom received from the Department samples of Star Brand Complete Cotton Manure, Pomona Guano and Empire Guano.

Soil, sandy, with light clay subsoil; has been in cultivation four years. Original growth, pine, mixed with oak.

Previous treatment.—The land was cleared in the spring of 1877, and sowed broadcast in field peas, and in 1878 it was cultivated in corn; in 1879 in cotton. No fertilizers were ever applied to the plat till this year.

Preparation.—The land was broken February 2d with bull-tongue scooter, very close. April 1st the rows were run off forty inches apart and seventy yards long, with a small shovel plow, and in these furrows the fertilizers were applied, and the land bedded with half-shovels, except the middles, which were opened with straight shovel.

Fertilizers were received too late to be used in composts.

Planted April 22d by opening the beds with a small scooter, followed by a V block; in this the seed were sown and covered with a board. A perfect stand was secured in ten days.

Cultivation.—May 20th, plowed with 18-inch sweep, and chopped to a stand May 23d. Hoed June 7th, and plowed again with an 18-inch sweep. June 22d, plowed with sweep and hoed. July 13th, plowed with sweep and hoed.

Seasons were not favorable. It rained April 27, 28, 29 and 30; May 1, 2, 3, 9, 10, 11, 12, 20, 21, 22; June 24 and 25 lightly; July 7, 10, 11, (accompanied with damaging storms,) 21, 22, 27, 28, 29 and 30; August 3, 4, 5, 6, 7, 8, 9, 10, 11, 18, 25, 26, 28, 29, 30, 31; November 4, 5, 6, 7, 8, 9, 11, 12, 17, 18, 19, 21, 22, 23, 24, 25, 27, 28, 30.

Remark—This is a very remarkable record of rainy days, making a season entirely too wet for the cotton plant.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertilizer applied pr Acre.	1st Picking		2d Picking		3d Picking		4th Picking		Yield in Seed Cotton	Yield in Lint Cotton
		Sept. 2.		Sept. 18.		Oct. 13.		Nov. 22.		per Acre.	per Acre.
<i>Plat No. 1.</i>											
aStar Brand Complete Cotton Manure.....	100	49	10	56	3	57		51	3	214	73
Whann's Plow Brand Raw Bone Superphosphate....	100	55	3	63	7	61	10	52		232	4
aPomona Guano.....	50	23	2	39		36		42	3	140	5
Unmanured.....		49		54		182		141	8	426	8
<i>Plat No. 2.</i>											
aEmpire Guano	200	192		199		173		158		722	
Unmanured.....		113		143		129		100		485	

EXPERIMENT OF MR. A. P. WISDOM, CARROLLTON, CARROLL COUNTY, GEORGIA.

Mr. Wisdom received from the Department samples of Potomac Guano and Soluble Pacific Guano.

Soil—Mulatto with red clay subsoil; has been in cultivation 40 or 50 years; original growth oak and hickory.

Previous treatment.—The plat was planted in corn in 1878, manured with stable manure and cotton seed. In 1879 it was sowed in wheat with 30 bushels of cotton seed broad cast per acre.

Preparation.—The stubble was turned in December with a one-horse turn plow about four inches deep. April 16th rows were laid off 3 feet wide and 70 yards long.

Fertilizers were applied at the rate of 147 pounds to the acre April 16th in shovel plow furrow, and ran a narrow scooter in the bottom of the furrow, listed with a scooter and finished the beds with turn plow.

Planted April 23d in small coulter furrow and covered with harrow.

Cultivation.—May 1st ran a harrow over the beds; 8th, sided with half scrapes; 12th chopped to a stand two stalks width of the hoe; 28th plowed out the middles with scooter and scraper; repeated this June 4th; plowed July 1st and 12th and hoed 15th, and laid by.

Seasons were too wet for cotton until middle of August, then there was a twelve days' drouth that caused the cotton to shed.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertilizer applied per Acre.	1st Picking	2d Picking	3d Picking	4th Picking	Yield in Seed Cotton per Acre.
	Date	Date.	Aug. 30	Date.	Sept. 23	Date.	Nov. 10
<i>a</i> Soluble Pacific Guano.....	lbs 147	lbs oz	lbs oz	lbs oz	lbs oz	lbs
Eagle Am'd Dis. Bone.....	"	.....	8	8	3	443
<i>a</i> Potomac Guano.....	"	.....	7	10 8	4	525 $\frac{1}{8}$
Roberson's Dis. Bone for Com.....	"	.....	8 8	9	4	501 $\frac{1}{8}$
Compost.....	"	.....	6	9 8	5	478 $\frac{1}{8}$
Cob Ashes.....	"	.....	6	9	5	466 $\frac{2}{8}$
All mixed.....	"	.....	4 8	7	3	328 $\frac{1}{8}$
Nothing.....	"	.....	9	9 8	4	525
	"	.....	2 8	6	3	235

EXPERIMENT OF MR. GEO. S. BLACK, ROME, FLOYD COUNTY, GEORGIA.

Gen. Black received from the Department samples of Bales' Standard Guano and Bradley's Ammoniated Dissolved Bone.

Soil—Dark mulatto upland with stiff red clay subsoil; has been in cultivation thirty years, original growth oak, hickory, poplar and black walnut.

Previous treatment.—The plat was cultivated in cotton in 1878 and 1879, lightly manured, broadcast, with barnyard scrapings. Previous to 1878, had been alternated in corn, cotton and small grain without fertilizer.

Preparation.—It was broken in March with long, square-pointed steel scooter, rows laid off 3 feet wide, 70 yards long; bedded with one horse Brinley turn-plow.

Fertilizers were applied in March and the land bedded in the usual way.

Planted April 16th; seed dropped with Dow Law planter and covered with iron toothed harrow; Peeler variety.

Cultivation.—May 7th, sided with half sweep, bar next to the cotton; followed on the 10th with hoes, chopping to two or three stalks to the hill; May 29th, plowed again with half sweep, this time with wing next to cotton, followed with hoes and reduced to a stand; June 22d plowed with narrow scooter and hoed; July 20th, laid by with Dickson sweep.

Seasons.—April 25th and 29th, heavy, cold, baking rains; May 1st and 2d frost, followed by cold east wind, which injured young cotton. No rain from April 29th to May 21st. In the mean time the ground baked and checked the growth of cotton. May 27th had a light warm rain which was beneficial. Light showers on the 1st, 3d, 6th, 18th, 25th, and 27th June, all of which were beneficial, though not good seasons. In July there were light showers on the 3d, 7th, and 21st. In August on the 2d, 12th and 23d, the last was accompanied by a severe wind and hail storm which did great damage to crops.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs of Fertilizer applied per Acre.		1st Picking	2d Picking	3d Picking	4th Picking	Yield in Seed Cotton per Acre.	
	Date.		Date.	Date.	Date.	Date.		
Not Fertilized.....	lbs	oz	lbs	oz	lbs	oz	lbs	oz
Not Fertilized.....	5	12	9				910	
αBale's Standard Guano.....	200	8	15	8	6	8	1050	
Not Fertilized.....	5	8	11	8	8		875	
αBradley's Ammonia'd Dissolved Bone	200	9	15	7	8		1120	
Not Fertilized.....	6	11	9				910	
Lorentz & Ritter's Sol. Am. Sup. Phos.	200	9	14	6			1075	
Not Fertilized.....	6	12	8				910	
Merryman's Am. Dissolved Bone.....	200	9	15	8	9		1190	
Not Fertilized.....	7	12	8				945	

Gen. Black says: I know by experiments which I have made that commercial fertilizers accelerate the growth of the cotton plant and maturity of the fruit, and to that extent is beneficial, but aside from that I do not regard it as a paying investment on our stiff clay land. On the ridges, and on our piney woods land, it pays much better, especially if the soil be gray and and light. It pays best on rich land, especially where it contains a fair supply of humus.

It is but fair to say, however, that a majority of our farmers regard it as a paying investment—and perhaps it is.

EXPERIMENT OF MR. S. M. H. BYRD, CEDARTOWN, POLK COUNTY, GEORGIA.

Maj. Byrd received from the Department samples of Gossypium Phospho, Ober & Sons' Dissolved Bone Phosphate, Merryman's Acid Phosphate and Charleston Acid Phosphate.

Soil, a mixture of red and gray land, being in a flat with gray land on one side and red on the other. Has been in cultivation twelve years. Original growth scrubby post-oak and some pine.

Previous treatment.—The land was in corn in 1876, and in cotton in 1877, 1878 and 1879.

Preparation.—The land was broken with a long scooter plow in March. Furrows were opened, the fertilizers applied a few days before planting and the land bedded with a one horse turn plow. Rows 3 feet wide and 140 yards long.

Fertilizers used without compost were applied at the rate of 200 pounds per acre. Each brand was composted as follows: 150 lbs. cotton seed and 150 lbs. stable manure were composted with 100 lbs. of each of the brands used. Major Byrd estimates the cotton seed and stable manure, 300 lbs. of the two, as equal in value to 100 lbs of the commercial fertilizers for which they were substituted. Results show that their agricultural value was much greater.

Planted middle of April in small furrow opened in the beds and covered with block.

Cultivation.—First barred with small turn shovel; May 15th chopped through with hoe; sixteen days afterward sided with shovel and chopped to a stand; June 22d ran two furrows to the row with scooter and scrape, and repeated the same about the middle of July.

Seasons were very good, except that part of the land was too wet in the spring.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs of Fertilizer applied per acre.	Yield in seed Cotton per acre.
<i>a</i> Gossypium Phospho.....	lbs. 200	lbs. 1250
100 lbs. " " and 300 lbs. cotton seed and manure.....	400	1550
<i>a</i> Ober & Sons Dis. Bone Phosphate.....	200	1200
100 lbs. " " " and 300 lbs. cotton seed and manure	400	1425
<i>a</i> Merryman's Acid Phosphate.....	200	1150
100 lbs. " " " and 300 lbs. cotton seed and ma- nure.....	400	1500
<i>a</i> Charleston Acid Phosphate.....	200	1100
100 lbs. " " " and 300 lbs. cotton seed and manure	400	1250
Acid Phosphate S. C.....	200	900
" " " and 300 lbs. cotton seed and manure.....	400	1300
Without Fertilizer.....		809

Maj. Byrd says, in regard to the use of fertilizers: "They have all paid, so far as my experience and observation go. Have not known of any worthless articles used."

The results of the compost with 100 lbs. per acre of the commercial fertilizer estimating the cost of the 400 lbs. of compost, as Maj. Byrd does, as equal to that of 200 lbs. of the commercial fertilizers, is quite satisfactory.

EXPERIMENT OF MR. ED. T. SHEPHERD, COLUMBUS, MUSCOGETM COUNTY, GEORGIA.

Mr. Shepherd received from the Department samples of Wando Fertilizer, P mona Guano, and L. & R. Ammoniated Soluble Phosphate.

Soil, sandy loam, river flat cleared by the Indians, and in constant cultivation by whites for over fifty years without rest. Original hard wood growth, oak, hickory and poplar.

Previous treatment.—The land was in oats in 1879, was in cotton for many years previous, and manured repeatedly with commercial fertilizers.

Preparation—The land was thoroughly broken with a three-horse Hughes' sulky plow, then bedded on the fertilizer with Watts' turning plow. Rows 300 yards long and 3 feet wide.

Fertilizers were applied at the rate 200 lbs. per acre.

Planted in the latter part of April, using fine improved seed.

Cultivation.—As soon as the cotton was up it was sided with solid sweep and hoed out, and subsequently plowed every two weeks with two-horse double sweeps and hoed a few days after each plowing, till it was ready to be picked.

Seasons favorable until about the 20th or 22d of May, when the heaviest rain ever known here fell—nearly ten inches—which seems to have dissolved and taken off all the soluble portions of the manures applied, as they seem to have done no good on the experimental plat nor on any other part of the crop, all of which was manured with phosphates of other brands in equal quantities.

TABULAR STATEMENT

Of Cotton produced, in which are given the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs. of Fertilizer applied per acre.	Yield in Seed Cotton per acre.
	lbs.	lbs.
αWando Fertilizer.....	200	800
αPomona Guano.....	200	875
L. & R. Ammoniated Soluble Phosphate.....	200	760
Without Fertilizer.....		720

EXPERIMENT OF MR. CHAS. H. SMITH, CARTERSVILLE, BARTOW COUNTY., GEORGIA.

Mr. Smith received from the Department samples of Bale's Standard Guano, Mound City Guano and Wando Acid Phosphate.

Soil light gray. Been in cultivation twenty years. Original growth red oak.

Previous treatment.—The land was cleared four years ago. It was turned under and the land planted in cotton in 1878 and 1879, and manured freely with barnyard manure.

The plat of five acres was planted in corn-hills, checked, four feet apart each way, two stalks to the hill. Bale's Guano was received in time and distributed in eight rows. The other fertilizers were not received until the corn was up, and was applied by the side of the corn; each to eight rows, with four unfertilized rows between the fertilized plats.

Fertilizers were applied at the rate of 200 pounds per acre.

Planted the corn March the 15th.

Cultivated thoroughly, plowing both ways through the checks.

TABULAR STATEMENT

Of Corn and Fodder produced per acre.

NAME OF FERTILIZER.	Lbs of Fertilizer applied per acre	Bushels of Corn per acre	Date of Planting	Date of Maturity.
Bale's Standard Guano.....	200	38	M'ch 15.	Sept. 1.
Mound City Guano.....	200	44	"	"
Wando Acid Phosphate.....	200	48	"	"
Without fertilizer.....		32	"	"

Mr. Smith says the fodder, on the rows to which the fertilizer was applied at the time of planting, was heavier than on those to which it was applied at the first plowing of the corn, though the latter produced more corn. This is in accordance with the experience of others who have experimented with applying the manure at different stages of the growth of the corn. The brace roots which do not ordinarily put forth until the stalk has nearly completed its growth, seem to serve the double purpose of supporting the stalk in position and supplying food for the production of the ear. The later applications are utilized by these roots.

EXPERIMENT OF MR. T. J. CASON, HARTWELL, HART COUNTY, GEORGIA.

Mr. Cason received a sample of Gossypium Phospho, which was sent to Mr. Seidell, Secretary Hart County Agricultural Society, from the Department, for soil test.

Soil, gray sandy, with yellow clayey subsoil. The plat was cleared from old field pines eight years ago. The original growth before first clearing was mixed—pine, oak, chestnut and other kinds of small growth such as hickory, dogwood, etc.

Previous treatment.—The plat was in oats in 1879, and has been in cotton and oats since it was cleared, with but little if any fertilizers.

Preparation—The land was broken 1st of February with bull tongue plow five or six inches deep. Furrows were opened 30th of March with straight shovel, followed with bull tongue plow in the same furrow running about seven inches deep. In these furrows the

Fertilizers were distributed at the rate of 200 pounds per acre, March 30th, and covered with a patent plow called the Boy Plow, a bull tongue following in these furrows also. The beds were finished by the same plow. The rows were 35 yards long and three and one-half feet wide.

Planted 16th of April in small bull-tongue furrow, covered with board, and had a good stand April 26th.

Cultivation—Sided May 4th with sweep; chopped 12th May nearly to a stand, and plowed again 24th May with sweeps. June 2d, chopped again; 17th, plowed again with sweeps, and 29th plowed out middles. July 5th, chopped again.

Seasons.—Were good to June 1st; very warm and dry first half of June. Rain-fall, March, 9 inches; April, 6.25; May, 2.40; June, 3; July, 1.60; August, 5.50; September, 2.45.

TABULAR STATEMENT

Of Cotton produced, in which are given the weight and date of each picking, the yield per acre resulting from the use of different fertilizers, and that from the natural soil.

NAME OF FERTILIZER.	lbs of Fertilizer applied pr Acre.	1st Picking		2d Picking		3d Picking		4th Picking		Yield in seed Cotton per Acre.
		Aug. 25.		Sept. 3.		Sept. 25.		Oct. 13.		
		lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	
<i>a</i> Gossypium Phospho.....	200		14	2	10	2	9		10	496
Soluble Pacific Guano.....	200	1		3	2	3	8		14	510
Patap-co Guano.....	200		3	1	10	4	4	2	2	491
Ob. r & Sons' Sol. Superphos. of Lime..	200	1	5	3		3	9		7	499
Unfertilized rows (average).....						2	8	2	15	326

The unfertilized column is an average of all the unfertilized rows which were between those fertilized.

Mr. J. M. Huie, Jonesboro, Clayton county, received Lyon Guano, and arranged his plat with care, but failed to get a stand of cotton, and hence was unable to report accurate results.

Mr. Samuel F. Gray, Sunny Side, Spalding county, received samples of Russell Coe's Ammoniated Bone Superphosphate, Soluble Pacific Guano, Sea Fowl Guano, and State Grange Fertilizer, and applied them to corn on bottom land, which was overflowed and the experiment ruined. He says: "I applied a ton to the acre, and there were some spots on the acre not washed away that made at the rate of 140 bushels per acre."

Mr. A. E. Tarver, Bartow, Jefferson county, received samples of Barry's Bi-phosphate of Lime, Etiwan Dissolved Bone, and Georgia Chemical Works Acid Phosphate, and applied them to cotton, but failed to keep an account of the pickings.

Mr. F. Grant Troup, Brunswick, Glynn county, received a sample of Vulcanite Guano No. 1 (for rice). He applied it to rice as directed, but had his crop destroyed by a gale in October, and hence was unable to report accurate results.

Mr. M. S. Paden, Woodstock, Cherokee county, received samples of Bales' Standard Guano, and Gossypium Phospho, but had the misfortune to have his arm broken in the spring, which prevented the bestowal of his personal attention to the experiment, and hence was unable to report results.

Mr. James Harwell, Covington, Newton county, received samples of Mastodon Ammoniated Soluble Phosphate, Sterne's Ammoniated Bone Superphosphate, and Vulcanite Guano No. 2 (for cotton), and applied them as directed, but failed to secure a stand, and hence could not report accurate results.

Mr. O. A. Adams, Americus, Sumter county, received only one of the three brands assigned him, viz.: Charleston Acid Phosphate, with which he did not experiment.

Mr. Thos. W. Gean, Athens, Clarke county, Ga., received samples of Dixie Ammoniated Phosphate, and Printup's Shell Lime, and applied them, but simply reports "a failure."

Mr. John Turner, Culverton, Hancock county, received samples of Barry's Acid Phosphate, Vulcanite Guano No. 2 (for cotton), and L. and R. Ammoniated Soluble Phosphate, which he composted; but during his absence as a witness in the U. S. Court, in Savannah, Ga., his composts were mixed so that no accurate report could be made.

Mr. W. A. Davis, Macon, Bibb county, Ga., received samples of E. Frank Coe's Ammoniated Bone Superphosphate, Crescent Bone and Eutaw Acid Phosphate, but had the misfortune to have his house with all his papers destroyed, and hence was unable to report.

Mr. Robert Wayne, Dublin, Laurens county, received samples of Eutaw Fertilizer (Light Black), Georgia Fertilizer, and Potomac Guano, which he carefully applied for test, and kept accurate records of every process connected with the test, but had the misfortune to have his house, with all of his papers, burned, in October, thus losing his memoranda, and hence could make no report.

Mr. S. L. Hollingsworth, Buford, Gwinnett county, received samples of Lion Guano Eureka Ammoniated Bone Superphosphate of Lime, and Navassa Guano, and commenced the experiment, but turned it over to Mr. R. L. Marbut, Buford Ga., who did not have the necessary data for an accurate report.

REMARK.

This report has been delayed by the unfavorable weather for picking cotton during the months of November and December, which retarded the termination of the experiments. Quite a number of the experimenters have not yet reported, but it is not deemed proper to delay the report longer, and hence it is put to press without them.

J. T. HENDERSON,
Commissioner of Agriculture.

REPORTS OF TESTS OF SEED DISTRIBUTED FROM THE DEPARTMENT OF AGRICULTURE OF GEORGIA, IN THE SPRING OF 1880.

HERLONG COTTON.

BANKS Co.--Mr. Chandler says: "The yield and quality as good as the best."

Mr. Martin—"Results satisfactory in yield and quality."

Mr. Langford—"Fine crop of bolls killed by frost—too late for this climate—yield poor, quality good."

Mr. Brown—"Very fruitful, but rather late for this climate; yield fair, quality good."

BARTOW Co.—Mr. Martin says—"The three varieties of cotton yielded as follows: Petit Gulf, 400 pounds seed cotton per acre; Herlong, 840 pounds; Jones' Improved, 1,360 pounds; common white seed cotton, 1,000 pounds per acre."

COBB Co.—Mr. McElreth—"Yield not so good as Petit Gulf, rather late for this climate."

Mr. Barnes—"Rather late for this climate."

HALL Co.—Mr. Simmons—"Not more than twenty seed came up. It is very prolific and a fine cotton, but rather late."

Mr. Rogers—"Planted 20th of May, is well fruited, but entirely too late for this climate. None picked Oct. 22d, while nearly every boll of the old green seed cotton is open and picked out."

F. M. Johnson—"Superior to any of the prolific cottons in this community—was compared with half dozen other kinds."

BIBB Co.—R. E. Park—"Produced from one-half to one-third more than the ordinary cotton under same circumstances."

Dr. Lee Holt—"It is all that is claimed for it."

CARROLL Co.—B. A. Sharp—"Failed to get a stand; only 200 plants matured, from which twenty pounds were picked to 28th October. It was two weeks later blooming than common cotton."

CALHOUN Co.—F. A. Parkins—"Thirty-one pounds seed cotton made eleven and a half pounds lint."

CLINCH Co.—David Cowart—"Excels any I ever saw. Have saved all the seed for planting next year."

H. D. O'Quinn—"A splendid cotton. I will save all the seed to plant another year."

COWETA Co.—S. L. Steed—"A very prolific variety, and valuable in every respect."

J. C. Mison—"Yielded 10 per cent. more than Dickson; more easily gathered, lint 15 per cent. better."

HENRY Co.—Wm. G. Horsley—"It has large bolls, short limbs, and is prolific, quite superior to my old kind in yield."

MORGAN Co.—R. E. Brobston—"Planted April 16th in an old peach orchard; soil, sandy loam; no guano used; was in oats in 1879; exposure southeast; had only three-fourths stand, on account of heavy rain followed by drouth." Each variety was planted in fifteen rows forty yards long.

HERLONG.

Yielded in seed cotton, 1st picking.....	10 lbs.
" " " " 2d "	10 "
" " " " 3d "	7 "
" " " " 4th "	10 "
" " " " 5th "	12 "
" " " " 6th "	15 "

Total..... 64 lbs.

Twenty-seven pounds ginned, yielded nine pounds lint.

JONES' LONG STAPLE PROLIFIC.

Yielded in seed cotton, 1st picking.....	18 lbs.
" " " " 2d "	19 "
" " " " 3d "	13 "
" " " " 4th "	14 "
" " " " 5th "	21 "
" " " " 6th "	15 "

Total..... 100 lbs.

Fifty pounds ginned, made eighteen pounds lint.

JONES' IMPROVED.

Yielded in seed cotton, 1st picking.....	4 lbs.
" " " " 2d "	10 "
" " " " 3d "	19 "
" " " " 4th "	15 "
" " " " 5th "	18 "
" " " " 6th "	10 "

Total..... 76 lbs

Thirty pounds ginned, made nine and a half pounds lint.

The same number of rows of Dillard cotton made fifty-eight pounds seed cotton with a full stand."

John W. Burney—"Herlong planted by the side of common cotton yielded one-third more."

McDUFFIE Co.—A. E. Sturgis—"Planted Herlong cotton seed in sandy loam with loamy clay subsoil; applied thirty bushels green cotton seed and 100 pounds Patapsco Guano broadcast per acre, and turned it under; applied seventy-five pounds Patapsco per acre in the drill; finished picking Oct. 27th, and on the 3d ginned it, and got at the rate of 610 pounds lint per acre."

OGLETHORPE Co.—S. D. Hardgree—"Fertilized and cultivated alike:
 Herlong yielded in seed cotton.....102 lbs.
 Jones' Improved yielded in seed cotton..... 90 "
 Petit Gulf " " " " 83 "
 Improved Simpson " " " " 86 "

G. B. Smith—"Planted equal plats, fertilized and cultivated alike in the following varieties, and with results as stated:

Herlong, $\frac{1}{2}$ stand, yielded in seed cotton.....104 lbs.
 Jones' Long Staple, $\frac{3}{4}$ stand, yielded in seed cotton.....105 "
 Improved Simpson, good stand, yielded in seed cotton.....116 "

The Jones' is a very fine long staple cotton."

TROUP Co.—W. R. Lord—"Planted Herlong cotton on land that would produce about 600 lbs. seed cotton of ordinary variety—have gathered 800 lbs. per acre, and will get 200 lbs. more."

Toney Linam—"Herlong planted by the side of the Dickson cotton, yield and quality better. I consider it an excellent variety."

JONES' IMPROVED COTTON.

BARTOW Co.—Mrs. S. E. Martin—"The three varieties of cotton yielded, under the same circumstances, as follows:

Petit Gulf yielded in seed cotton per acre..... 400 lbs.
 Herlong " " " " " " 840 "
 Jones' Improved " " " " " " 1360 "
 Common white seed cotton yielded in seed cotton per acre..... 1000 "

J. T. Lindley—"Did not give satisfactory results."

COBB Co.—H. S. Barnes—"Planted on high red land and applied 200 pounds Eureka Guano per acre. Though there was not more than half a stand, and injured by drouth, the yield per acre was 910 pounds seed cotton."

FLOYD Co.—Thos. Reynolds—"Doesn't suit our country, too late, doesn't mature well."

S. M. H. Byrd—"Think it a very desirable kind. It is productive, as early as any other, the bolls *very large*, cotton holds well in the burs and yet is not hard to pick."

BIBB Co.—Albert E. Johnson—"It is a good cotton. Planted on same day and same plat of land, will make one-fourth more than my old stock of cotton. Its quality compares favorably with that of other varieties."

Dr. Lee Holt—"Did not prove a success—too dry."

MERIWETHER Co.—Wm. J. Ellis—"Hardly any difference between Jones' Improved cotton and the ordinary seed used here, and much inferior to what we call the "big-boll" cotton."

JONES' LONG STAPLE UPLAND COTTON.

FLOYD Co.—Thos. Reynolds—"It is the best cotton I ever have seen. Will make, from 250 hills, 125 pounds cotton."

BIBB Co.—A. E. Johnson—"Staple fine, but yield not so good as Jones' Improved."

CLARKE Co.—A. S. Dorsey—"I find it a very large, fine balled, long staple cotton. Planted three rows 100 feet long—stand not very good. I have picked from the three rows 23½ pounds seed cotton, and expect to get ten or fifteen more. It is as fine as any cotton I ever saw."

HANCOCK Co.—J. R. Lewis—"Had a poor stand on account of a baking rain, 22d of May, two days after it was planted. The lint is longer and the bolls larger than the varieties commonly grown. The yield compares favorably with that of short staple cotton. The plant is a vigorous grower, and branches early. The cotton does not fall from the boll, and is somewhat harder to pick. I expect to plant it next year."

PIKE Co.—R. J. Powell—"Planted two sacks each of Petit Gulf and Jones' Long Staple—have gathered to date from Jones' Long Staple 259 pounds seed cotton, from Petit Gulf 319 pounds. Jones' seems to be more backward than the Petit Gulf, as there is more still to open—the bolls are larger. Weather unfavorable to both, but think both good cottons."

CALHOUN Co.—F. A. Parkins—"Lint whitest seen. Fifteen pounds seed cotton gave 5½ pounds lint."

SUMTER Co.—T. M. Merritt—"It is a fine variety as to quality but not quantity; has fine large bolls, fine staple and does not fall out, but the yield not extra large compared with common cotton."

PETIT GULF COTTON.

BANKS Co.—C. T. Burgess—"Petit Gulf cotton seed badly mixed with other varieties. Yield fair, quality good."

H. Wade—"They were badly mixed with other varieties. Yield fair, quality good."

COBB Co.—W. A. McElreth—"Lint fine and very white; yielded 300 pounds per acre more than common cotton; the best for thin land of any I have tried."

John P. Martin—"Planted 28th April, on red land, fertilized with 150 pounds Cumberland Guano per acre; yield, 1,722 pounds seed cotton per acre—one-third more than other varieties."

N. E. Williams—"Yielded on gray land 1,000 pounds per acre; 200 pounds more than Jones' Improved."

HALL Co.—C. C. Sanders—"The staple is fine and yield wonderful."

PAULDING Co.—Benj. T. Drake—"The Petit Gulf is the best of four varieties tested."

BIBB Co.—A. M. Locket and J. W. Myrick—"Limbs too long and not prolific enough, bolls very large."

CLARKE Co.—A. S. Dorsey—"Bolls small, staple short; not desirable by any means."

Geo. T. Murrell—"Received packages of Jones' Improved cotton seed, Herlong and Petit Gulf, and planted each of them, and some of the common cotton, in nine rows, three feet wide and sixty feet long. The stand averaged a stalk every twenty inches. The production from the nine rows was respectively as follows:

Jones' Improved, produced	34 lbs. seed cotton.
Herlong, " "	30 " " "
Petit Gulf, " "	26 " " "
Common Cotton, " "	28 " " "

Jones' Improved superior to the others in quality of staple, sheds its forms less in dry weather and has larger bolls than the other varieties. The yield of each was small, on account of several weeks of drouth."

CARROLL Co.—M. R. Russell—"It makes a large stalk with long limbs and long joints; bolls large, fruited well, is ten days to two weeks later than other varieties planted; will get at the rate of 1,500 pounds seed cotton per acre."

N. T. Skinner—"Its growth was vigorous and healthy and it fruited heavily, but I find it a little later than other varieties, and therefore not so well adapted to this section of country."

COWETA Co.—W. H. Steed—"A large balled, long limbed variety, but not prolific enough to be valuable."

J. C. Mixon—"Lint longer and finer than Herlong or Dickson, but later."

DEKALB Co.—T. J. Flake—"The Petit Gulf grew, fruited and retained its fruit and foliage. It grew at least one-third larger than the common cotton that was planted next to it and treated in the same manner, and I think made one-third more cotton. It is my opinion that the Petit Gulf is an excellent poor land cotton."

HANCOCK Co.—John R. Lewis—"The Petit Gulf is an excellent cotton, superior in every respect to the prolific varieties which have run this section wild."

OGLETHORPE Co.—Paul W. Durham—"Bolls very small, did not yield as well as the Simpson variety on the same land."

SUMTER Co.—T. M. Merritt—"Am particularly pleased with the Petit Gulf cotton. It makes slowly and retains its forms better than any other variety planted. The bolls are small, fibre fine, and yields one-fourth more than the common kinds. It has stood drouth this year without shedding."

RAMESES COTTON.

BIBB Co.—Dr. Lee Holt—"Rameses cotton a failure."

HENRY Co.—Wm. G. Horsley—"Quite similar to the Herlong; very good cotton; quite superior to the old kind in yield."

CLINCH Co.—H. D. O'Quinn—"Rameses very much like the Herlong; very prolific; splendid cotton, will save all the seed to plant another year."

NEWMAN'S WHITE PROLIFIC CORN.

BANKS Co.—J. W. Chasteen—"Results satisfactory; yield and quality good."

BARTOW Co.—Mrs. S. E. Martin—"Yielded 23½ bushels per acre."

R. H. Dodd—"Planted one-sixteenth acre, well prepared and manured; yield

about five bushels corn; ears small, grain hard and ninty—on pop-corn order—not desirable."

COBB Co.—J. T. Lindley—"Ears very small, but will produce from two to six ears to the stalk; will not do to plant for a crop."

"NOTE.—C. H. Anderson says the Buncombe cabbage are the finest he ever raised."

J. S. Camp—"It did well and yielded well."

W. A. McElreth—"Yields from three to five small ears to the stalk; grain very short; don't think it valuable for general cultivation."

H. S. Barnes—"Newman's prolific corn, planted April 28th, without manure, made at the rate of thirty-two bushels per acre, was ripe by the 20th of August. The result was satisfactory."

FLOYD Co.—H. T. Kinnebrew—"Planted the Newman's prolific white corn April 20th; it was ripe for bread August 15th. One-eighth of an acre planted yielded four or five bushels. It yields nearly twice as much as other varieties. I think it advisable to plant a small portion of the corn each year on account of its early maturity."

POLK Co.—S. M. H. Byrd—"Newman's prolific corn is very fine, had from two to four ears to each stalk; the ears are not so large as the common corn, but of fair size and very sound."

"NOTE.—The tobacco seed were given to tobacco users, who report good results; quality good—Havana best."

PAULDING Co.—B. T. Drake—"It is fine, very prolific."

WALKER.—John B. Henderson—"Planted 2d May, on very rich clay soil, in rows 4½ feet apart and thinned to sixteen inches in the drill. It matured in twelve weeks, producing from three to four ears from six to nine inches long on each stalk. Two crops of this corn can be made on the same ground in one year, in this latitude. I think it a very desirable corn for early and late roasting ears."

BIBB Co.—A. E. Johnson—"This is an early corn, produces a great deal more than the common gourd seed corn, but don't think it is quite so nutritious as the large kind."

W. D. H. Johnson—"Season too dry; had from one to four ears to the stalk; ears small and long. Would do to plant a part of a crop to get the benefit of early rains."

"NOTE.—Buncombe cabbage did well, considering the drouth better than those from northern seed with the same attention."

Dr. Lee Holt—"Season too dry, but the corn is too small for our farmers.

Hudson corn had from four to six ears to the stalk, very small; am not pleased with it."

"NOTE.—Buncombe cabbage given to laborers proved a great success."

CLAYTON Co.—E. Huie—"Am well pleased with Newman's prolific corn; the ears were small, the grain firm and flinty. The yield was good—am confident I made one-third more on the plat than on those adjoining planted in the common corn of the country. Am not prepared to say it would be safe to risk a whole crop in it, will test it further next year."

CARROLL Co.—M. R. Russell—"Planted the corn 22d of June, it grew rapidly and matured quick, making from two to three ears to the stalk. I think it a good variety for early planting. The distribution of seed from your department is doing a great deal of good in our section, acting as a stimulus to the farmers."

N. T. Skinner—"Planted 2d week in March; its growth was rapid, matured very early, made from two to four ears to the stalk—though they were small; a very fine variety for early use as roasting ears, and for bread it is the best variety I have ever used. I like it so well I expect to plant several acres with it next year."

"NOTE.—Got a poor stand of Buncombe cabbage, the few that lived made fine heads of excellent flavor."

COWETA Co.—J. C. Mixon—"A poor corn for me."

FULTON Co.—W. L. Mangum—"Planted Hudson and Newman's prolific corn; find them both fine prolific varieties and valuable, ripening ten or fifteen days earlier than the other varieties, and the yield is as good if not better than that of the common corn. Judge Pegg is delighted with his, and thinks of planting it largely another year."

TROUP Co.—Tony Linam, Jr.—"Find Newman's prolific corn from fourteen days to three weeks earlier than other varieties—will answer for garden crops, but I do not commend it for a general field crop."

"NOTE.—The Havana and Oronoco tobacco yielded splendidly, both varieties are of excellent quality. Under the present law, tobacco is not a salable product, but it would be advisable for every farmer to cultivate so much of it to keep his dollars at home and have a pure and good article."

TALBOT Co.—W. H. Ellison—"Does not give satisfactory results as field corn—ears small—would do well as a garden corn."

"NOTE.—Havana tobacco gave satisfactory results; the yield not so great as other kinds, but is far superior in quality."

CLINCH Co.—David Cowart—"Newman's white prolific corn was planted on half acre, March 27th, yielded twenty bushels and two quarts—land not fertilized last two years."

H. D. O'Quinn—"Planted Hudson corn in May; did not get a good stand, seems to be mixed; cob too large, grain short. Will not save the seed."

INDEX.

A

Adams, A. A.	58
Acid Phosphate, S. C.	55
Albermarle Guano.	7, 13, 23
Alta Am'd Guano	21, 40
Atlantic Acid Phosphate.	24, 50

B

Bahama Guano.	33
Baldwin & Co's, Am'd Sup-Phos.	10, 15, 21, 22, 34, 44, 46, 51
Bale's Acid Phos.,	16
Bale's Guano.	43, 54, 56
Baker's Standard Am'd Sup-Phos.	7
Barry's Chem'l Fertilizer.	27
Barry's Acid Phos.	40
Baugh's R. B. Sup-Phos, of Lime.	17, 21, 25, 41
Bawker's Cotton Sup-Phos.	25
Bell, A. A.	23
Bellflower, Elijah.	18
Black, Geo. S.	58
Black's Pat. Compost	19
Bradley's Pat. Sup-Phos.	21, 50, 51
Bradley's Am'd Dis. Bone.	17, 22, 46, 54
Brewer, J. C.	51
Brighton Am'd Sup-Phos.	25
Browne, Prof. Wm. M.	45
Bryan, Mrs. J. W.	28
Burton, Robert.	9
Byrd, S. M. H.	54

C

Carswell, J. H.	30
Cason, T. J.	57
Charleston Acid Phos.	55
Chesapeake Guano.	9, 20, 33, 34
Cob Ashes.	53
Coe, R. D., Original Bone Phos.	35
Colgate Manure.	9, 19, 48
Compost	12, 14, 16, 17, 24, 26, 30, 33, 35, 36, 40, 43, 44, 46, 47, 49, 50, 53, 55
Corn—Newman's White Prolific.	64-66
Corn—Hudson.	65-66
Cotton—Herlong.	60-62
“ —Jones' Improved.	62
“ —Jones' Long Staple Upland.	63
“ —Pett Gulf.	68
“ —Rameses.	64
Cox, James M.	17
Cumberland Sup-Phos. of Lime.	5, 10, 17, 37, 46

D

Davis, W. A.....	59
DeLaney, T. N.....	15
DeLeon's Complete Cotton Fertilizer.....	27, 29, 33, 46
Dennis, J. T.....	38
Dill, J. M.....	47
Directions for Conducting Tests.....	3-4
Dissolved Bone.....	15
Dixie Phosphate.....	41
Dobbs Am'd Cotton Fertilizer.....	14, 36, 40

E

Eagle Am'd Bone Phosphate.....	20, 53
Edmondson, W. P.....	42
E. Frank Coe's Am'd Sap-Phos.....	18
Elder, W. A.....	35
Elitson, W. H.....	32
Empire Guano.....	30, 41, 52
Etiwan Guano.....	46
Etiwan Crop Food.....	46
Etiwan Compost.....	33
Everett, R. W.....	6-7
Eureka Am'd Bone Sup-Phos.....	10, 42
Eutaw Acid Phos.....	16
Eutaw Fertilizer (Brown).....	35
Eutaw Fertilizer.....	37
Eutaw Fertilizer (Deep Black).....	38, 49
Experiment.....	51
Excellenza.....	51

F

Farmer's Friend.....	15, 21
Frederick, James D.....	31

G

Gean, Thos. W.....	58
Georgia State Grange Fertilizer.....	36, 46, 51
Georgia Chemical Works Acid Phos.....	38
Georgia Fertilizer.....	12
Giant Guano.....	31, 3, 31, 35
Gossypium Phospho.....	5, 19, 25, 41, 46, 49, 55, 58
Goss, W. J.....	13
Grange Mixture.....	46
Gray, S. F.....	58

H

Harwell, James.....	58
Heard, E. B.....	34
Herlong Cotton—Reports of Tests.....	60-62
Hollingsworth, S. L.....	59
Home Fertilizer.....	42
Hope Guano.....	7, 20, 34
Horner South Sea Guano.....	21
Huie, J. M.....	58

J.

Johnson, W. D. H.....	25
Jonas' Improved Cotton.....	62
Jonas' Long Staple Upland Cotton.....	63

K.

Kainit Compost.....	19
King Guano.....	50

L.

Ladd's Lime and Ashes.....	18
Lindley, J. T.....	14
Lister Bros. Standard Pure Bone.....	18
Lister Bros. Crescent Bone Fertilizer.....	19, 22, 38
L. & R. Ammoniated Sol. Phos.....	41, 50, 54, 56
Lowe's Georgia Formula.....	46

M.

Mapes' High Grade Nitro-Phos.....	38, 47
Mastodon Am'd Sup-Phos.....	5, 23, 46, 47
McDaniel, G. A.....	8
McNulty, M. A.....	4, 5
Merryman's Acid Phos.....	31, 55
Merryman's Am'd Dis. Bone.....	7, 21, 25, 30, 32, 44, 54
Middlebrooks, J. C.....	12
Monarch Guano.....	9, 26, 46
Mound City Guano.....	56
Murray, J. B.....	22

N.

National Am'd Sol. Bone.....	44
Navassa Am'd Sol. Phos.....	16
Navassa Acid Phos.....	14, 22, 30
Newman's White Prolific Corn.....	64-66
None Such Manipulated Guano.....	27, 44

O.

Ober & Son's Dis. Bone Phos., S. C.....	25, 49, 55
Ober & Son's Sol. Sup-Phos.....	44, 46, 53
Odum, S. P.....	51
Orient Complete Manure.....	24, 25, 26, 31, 32, 44, 46

P.

Pacific Guano Co.'s Comp'd Acid Phos.....	27, 37
Paden, M. S.....	58
Pamlico Guano.....	7, 18
Patapsco Guano.....	21, 35, 38, 46, 53
Patapsco Acid Phos.....	22, 49
Patapsco Am'd Sol. Phos.....	26, 27
Peruvian Guano, No. 1.....	51
Petit Gulf Cotton.....	63-64
Piedmont Guano.....	22, 28, 30
Pomona Guano.....	46, 51, 52, 56
Popplein's Silicated Phosphate.....	31, 32, 51
Potomac Guano.....	23, 53
Printup's Shell Lime.....	42

R.

Ragsdale's Am'd Dis. Bone.....	7
Rameses' Cotton.....	64
Raw Bone.....	27
Reaves & Nicholson's Cotton Grower.....	30
Rhodes, A. W.....	23
Roberson's Dis. Bone.....	53
Russel Coe's Am'd Dis. Bone.....	10, 25, 28, 44
Russell, M. R.....	19

S.

Seago, B. N.....	26
Sea Island Guano.....	9, 19, 24
Sea Fowl Guano.....	47
Seeds—Reports of Tests.....	60
Shepherd, Ed. T.....	55
Sheppard, C. C.....	33
Smith, Chas. H.....	56
Snowden's Acid Phos.....	14
Soluble Pacific Guano.....	7, 21, 26, 58, 58
Speer, W. A.....	43
Sproull, C. W.....	43
Stallworth, Thos. H.....	24
Star Brand Complete Cotton Manure.....	21, 52
State Grange Fertilizer.....	33
Stable Manure.....	9, 31, 36
Sterling Guano	23, 25, 46
Stewart, W. A.....	16
Sterne's Am'd Dis. Bond Sup-Phos.....	7, 15, 42

T.

Tarver, A. E.....	58
Taylor, Eden.....	41
Troup, F. Grant.....	58
Turner, W. A.....	50
Turner, John.....	59

V.

Vulcanite Guano.....	5, 15, 16, 26, 29, 46, 48
----------------------	---------------------------

W.

Wando Acid Phos.....	25, 56
Wando Fertilizer.....	36, 49, 56
Wayne, Robt.....	59
Wellons, E. S.....	49
Whann's P. B. B. B. Sup-Phos.....	36, 42, 48, 49, 52
Wilder, B. F.....	10
Wilcox, Gibbs & Co. Manipulated Guano	23, 28, 31, 32, 42
Wingfield, J. T.....	40
Wimberly, F. D.....	48
Wisdom, A. P.....	52
Witcher, C. M.....	21
Woods, M. A.....	36
Wright & Co. Solid Guano.....	44

Z.

Zell's Am'd Bone Sup-Phos.....	9, 20
Zell's Acid Phosphate.....	27
Zell's Economizer.....	50



Circular No. 14½ }
NEW SERIES. }

SUPPLEMENTAL REPORT—1880.

**SHOWING THE YIELD OF THE LEADING CROPS OF THE STATE
COMPARED TO THAT OF 1879, AVERAGE YIELD PER ACRE,
ETC., CONSOLIDATED FROM THE REPORTS OF
CROP CORRESPONDENTS.**

**RETURNED TO THE DEPARTMENT OF AGRICULTURE
DECEMBER 15, 1880.**

**Also a Short Chapter on the Habits and Management of
German Carp.**

DEPARTMENT OF AGRICULTURE,
ATLANTA, GA., January 15th, 1881.

GENERAL STATE AVERAGES.

For a concise view of the averages for the different sections and for the whole State, see the tabular statement on another page. The seasons were unpropitious for all grain crops, and especially so for wheat and oats. Only the more hardy varieties of wheat, such as the Dallas, Purple Straw, and Nicaragua escaped almost total ruin from rust. All varieties of oats except the rust-proof varieties failed in every section of the State, and in the Southwest even the rust-proof were injured where great care had not been exercised in preserving the purity of the seed.

CORN

Is reported very low, when it is remembered that the crop of 1879 was a short one, being only 82 for the State, and the average yield per acre 9.7 bushels. In North Georgia the comparative yield was 93, and the average yield per acre 14 bushels; in Middle Georgia comparative yield 78, yield per acre 8 bushels; in Southwest Georgia, comparative yield 98, yield per acre 7 bushels; in East Georgia, comparative yield 77, yield per acre 8; in Southeast Georgia, comparative yield 106, yield per acre 11 bushels.

COTTON

Is reported 104, or four per cent. better than in 1879, in the whole State, and the average yield per acre 541 pounds, or 79 pounds seed cotton more than in 1879.

In the September Report, consolidated from returns received October 1st, the estimated yield of cotton in the State compared to that of 1879 was 97, seven less than the present estimate, notwithstanding the months of November and December were so unfavorable for gathering the crop, which is not yet all gathered in some localities.

The averages reported for the different sections are as follows: Comparative yield in North Georgia, 103; yield per acre in seed cotton, 584 lbs. In Middle Georgia comparative yield 106; yield per acre 552 lbs. seed cotton. In Southwest Georgia comparative yield 102; yield per acre 463 lbs. seed cotton. In East Georgia comparative yield 102; yield per acre 538 lbs. In Southeast Georgia comparative yield 106; yield per acre 550 lbs.

SUGAR CANE.

The latter part of summer and early fall were very favorable to the growth of cane in those sections of the State in which it is principally grown, and the yield has been good. The comparative estimate for the State is 92, and the average yield per acre 190 gallons syrup, 25 gallons more than in 1879.

Two counties in North Georgia report cane, and a yield of 137 gallons per acre. In Middle Georgia the comparative yield is 90, and the yield per acre 129 gallons. In Southwest Georgia the comparative yield is 100, and the yield per acre is 209 gallons. In East Georgia the comparative yield is 88, and the yield per acre 182 gallons. In Southeast Georgia the comparative yield is 85, and the yield per acre 288 gallons.

RICE.

No separate estimate is made of upland and lowland rice, but the number of interior counties in which it is cultivated indicates increased interest in upland culture.

The comparative estimate for the State is 99, and the average yield per acre 35 bushels of rough rice. In North Georgia the comparative yield is 98, yield per acre 37 bushels. In Middle Georgia, comparative yield 95, yield per acre 42 bushels. In Southwest Georgia comparative yield 102, yield per acre 21 bushels. In East Georgia the comparative yield is 88, and the yield per acre 22 bushels. In Southeast Georgia the comparative yield is 95, and the yield per acre 25 bushels.

Rice is reported by those who have cultivated it in the interior as a very profitable crop. Mr. R. M. Brooks, of Pike county, produced more than 100 bushels per acre on creek bottom, by irrigation. He has twenty acres of this bottom so prepared by levees and water-gates that he can flood it at pleasure. He prepares the land in spring, sows his seed *broadcast*, floods sufficiently to cause prompt germination, and takes off the water. As soon as the plants are large enough (when they become entirely independent of the support of the mother grain), the water is turned on and remains until the rice is nearly ready for harvest, when it is taken

off to allow the soil to dry sufficiently to admit the harvesters. By sowing broadcast he has so many more plants per acre than when sown in drills that his production far exceeds that on the old system. His rice costs him no labor except the preparation of the soil, sowing the seed, and harvesting the crop, the continuous flooding removing the necessity for cultivation.

WHEAT.

The last season was perhaps the most disastrous to the wheat crop ever known, only the most hardy varieties escaping total ruin by rust. The comparative estimate is only 52 in 1880 while it was 111 in 1879, comparison made in each case with the year previous. The comparative yield in North Georgia is 47; yield per acre, 4 bushels. In Middle Georgia, comparative yield 43; yield per acre 4 bushels. In Southwest Georgia, comparative yield 46.6; average yield per acre 3.1 bushels. In East Georgia, comparative yield 51; yield per acre, 4.5 bushels. None reported in Southeast Georgia.

OATS.

With the exception of the rust-proof varieties, the oat crop of the State was almost a total failure, much of them being so badly injured by rust that they were not harvested at all. The importance of good seed, and the value of the rust-proof varieties of oats, have been very forcibly impressed upon the farmers of Georgia by the results of the last season.

The crop of the State seems to have been injured worse in North Georgia than in any other section of the State. This is due mainly to the fact that a smaller per cent. of the crop in that section was sown with rust-proof varieties than elsewhere.

The estimated yield in the State compared to that of 1879 is 75, and the yield per acre 11 bushels. In North Georgia, the estimated comparative yield is 47, and the yield per acre 7 bushels. In Middle Georgia, comparative yield 81; yield per acre, 14 bushels. In Southwest Georgia, the comparative yield was 56; yield per acre, 9.9 bushels. In East Georgia, comparative yield 75; yield per acre, 13 bushels. In Southeast Georgia, comparative yield, 56; yield per acre, 8 bushels.

FIELD PEAS.

In consequence of drouth at the usual time for planting peas between the corn rows, the area devoted to this crop was somewhat reduced. The comparative estimate is below that of 1879, except in Southeast Georgia, where it is 3 per cent. above. The comparative yield for the whole State is 81, and the yield per acre 5 bushels.

SWEET POTATOES.

The month of August was very favorable for the growth of this crop, but the moist fall was unfavorable for maturing any gathering, hence, though a large crop was made, a considerable per cent. of that gathered has been lost by rot, owing to the succulent, immature condition of the potatoes when dug.

The estimated yield in the State, compared to that of last year, is 111, and the

average yield per acre 110 bushels. The comparative yield in North Georgia is 110, and the yield per acre 105 bushels. In Middle Georgia, the comparative yield is 120, and the yield per acre 93 bushels. In Southwest Georgia, the comparative yield is 107, and the yield per acre 113 bushels. In East Georgia, the comparative yield is 96, and the yield per acre 133 bushels. In Southeast Georgia, the comparative yield is 98, and the yield per acre 171 bushels.

SORGHUM.

The yield of sorghum, compared to that of last year, in North, Middle, Southwestern and East Georgia, is 83, 87, 45 and 89. The yield in gallons of syrup per acre in the same sections in the order named is 68, 57, 75 and 88.

The average yield of ground peas in the State is 23 bushels per acre; of chufas, 35 bushels per acre. The average yield of millet hay in the State is 2 tons per acre; of clover hay, 1.9 tons per acre; that of other hay—some reporting pea vines, some crab grass, and others herds grass, is 2 tons; that of forage corn is reported at the very low estimate of 3.5 tons per acre.

ACREAGE IN SMALL GRAIN.

Owing to continuous rains during the months of November and December the area sown in wheat and fall oats is less than usual. The comparative estimate of the area sown in wheat is 83 against 100 in 1879, and in oats, 82 against 98 in 1879.

The following comparative statement of the rainfall in the different sections of the State in 1879 and 1880 will be interesting.

RAINFALL IN

	North Georgia.	Middle Georgia.	S. W. Georgia.	East Georgia.	S. E. Georgia.
November 1879.....	4.41 in.	2.82 in	1.40	1.55	2.06
November 1880.....	8.25 "	5.65 "	4.68	6.50	3.96

Means for the State—in 1879, 2.95 inches; in 1880, 6 inches.

Usually a large per cent. of the wheat crop of Middle and Southern Georgia is sown in December, but there has been no time during December 1880, when such work could be done. Not only so, but the weather thus far (14th) in January 1881, has not been suitable for stirring the soil for any purpose.

The bulk of the oat crop for 1881 must be spring sown, which are never so profitable south of Atlanta as those sown in the fall.

PORK SUPPLY.

There is a small reduction in the amount of home-raised pork, compared with 1879, in every section of the State, except in Southeast Georgia, where it is two per cent. greater. In North Georgia, it is reported at 96; in Middle Georgia, 93; in Southwest Georgia, 96; in East Georgia, 86, and in Southeast Georgia 102; for the whole State, 94.

BALES OF COTTON PER PLOW.

The average number of bales of cotton, of 450 pounds each, produced by each plow run on the farms, is estimated, for the whole State at five. In North Georgia, it is 4; in Middle Georgia, 5.3; in Southwest Georgia, 4.8; in East Georgia, 5, and in Southeast Georgia 2.6.

CONDITION OF FARMERS.

In answer to the question, "Are farmers generally in a better or worse condition than last year?" for the whole State, ninety-nine correspondents (or a fraction over 64 per cent. of the whole number) report "better," twenty-nine report "the same" and twenty-six "worse."

In North Georgia, thirty-two say better, seven the same, and six worse. In Middle Georgia thirty-six say better, seven the same, and nine worse. In Southwest Georgia, fourteen say better, six the same, and three worse. In East Georgia, twelve say better, four the same, and nine worse. In Southeast Georgia, five say better, five the same and one worse.

INDEBTEDNESS OF FARMERS.

The indebtedness of farmers compared to that of 1879, is reported at 82 for the State. In North Georgia, 71; in Middle Georgia, 85; in Southwest Georgia, 96 in East Georgia, 78, and in Southeast Georgia, 65. This sustains the report of the condition of farmers and shows that the farmers are gradually recovering from the disastrous effects of speculative farming and the low price of cotton.

HOME SUPPLIES PRODUCED.

Owing to the almost total failure of the wheat crop, and the loss of the oat crop, except the rust-proof varieties, followed by a short crop of corn, the supply of farm products for home consumption is short. In reply to the question, what per cent. of a full supply of provisions for 1881, have been produced in your county this year?" correspondents report for the whole State 71 per cent. For North Georgia, 80; Middle Georgia, 62; Southwest Georgia, 75; East Georgia, 69 and Southeast Georgia, 81.

SUPPLIES PURCHASED.

In reply to the question "Have farmers in your county purchased more or less farm supplies this year than last?" 93 correspondents say "less," 16 "same," and 31 "more" for the whole State, and report 13 per cent. less supplies bought. In North Georgia 24 correspondents say "less," 4 "same," and 5 "more." In Middle Georgia 38 say "less," 5 "same," and 11 "more." In Southwest Georgia 12 say "less," 2 "same," and 8 "more." In East Georgia 14 say "less," 2 "same," and 6 "more." In Southeast Georgia 5 say "less," 3 "same," and 1 "more." In North Georgia they report 33½ per cent. less; in Middle Georgia 17 per cent. less; in Southwest Georgia 2 per cent. more; in East Georgia 13 per cent. less; and in Southeast Georgia 18 per cent. less. These facts are somewhat more encouraging than the following relating to the

COST OF BACON AND CORN.

Many still contend that it is economy to buy instead of raising bacon and corn on the farm. The following table of facts from the farmers themselves needs no comment to convince the most incredulous of the suicidal policy not only of purchasing at credit prices but of purchasing at all, except perhaps sufficient bacon to supplement a short home supply. Indeed, with the present system of employing labor it is almost impossible to produce pork enough for a full supply on farms devoted principally to the production of cotton. The special attention of farmers is invited to the following

TABLE showing the cash and credit prices of bacon and corn in the different sections of the State, the average for the whole State, and the percentages paid on the cash price.

	BACON.				CORN.			
	Cash price.	Time price.	Per cent. on cash price 6 months.	Per cent. on cash price per annum.	Cash price.	Time price.	Per cent. on cash price 6 months.	Per cent. on cash price per annum.
North Georgia.....	9c	11c	22.2	44.4	64c	\$.90	40	81.2
Middle Georgia.....	8.5	10	18.7	37.4	78.6	1.12	29.8	59.6
Southwest Georgia.....	9	11.3	25.5	51	90	1.16	28.8	57.6
East Georgia.....	9	11	22.2	44.4	84	1.05	28	57
Southeast Georgia.....	10	11.5	15	30	85	1.11	30	61.2
The whole State.....	9	10.8	20	40	78	1.12	30.7	61.4

Note.—In the above table, it is assumed that the average time for which advances are made is six months.

IMPROVED SEED.

The selection and improvements of agricultural seeds receive much less attention in the South than their importance demand. A certain area of land should be selected on each farm every year for the especial purpose of producing seed for planting. From these seed-plats, selections should be made every year from the best specimens, with a view not only of preserving the purity of the varieties, but of increasing their productiveness.

The Commissioner of Agriculture will do all in his power, with the means at his disposal, to procure and distribute among the farmers of the State the best varieties obtainable. Such distribution, however, will be without profit unless those who receive the improved seed use the means necessary to perpetuate their purity. The hope is entertained that those who receive from the Department packages of seed will use the precaution to plant them sufficiently far from common varieties of the same family of plants to prevent hybridizing or mixing the varieties, and select, at maturity, the best specimens for planting for seed the next year.

The object of the distribution is not to supply planting seed for crops, but to introduce improved and valuable varieties only in sufficient quantities to form basis of improvement. The benefits to be derived from the distribution of seeds will depend entirely upon the use made of them by those who receive them. The Commissioner of Agriculture earnestly solicits the co-operation of farmers in his efforts to improve the varieties of agricultural plants cultivated in the State.

IMPROVING LAND.

Mr. James Thorn, Ivanhoe, Bullock county, says: "No farms pay unless in a high state of cultivation. The point for farmers to get at is to bring their farms to that condition without using so much commercial fertilizers. What is the best mode to do it?"

This is a question of so much importance and of such general interest that attention is given it here rather than in a personal letter. At once the cheapest and most permanent means of improving lands without the use of costly manures is by the combined use of green vegetable matter, grown on the soil, and lime. Nearly all of the soil of Bullock county is deficient in lime, and most of the fields which have been in cultivation for any considerable length of time need vegetable matter. Nature has supplied the lime in the form of marl in all that portion of the State in which it is most deficient in the soil, though the latter overlies the marl.

The vegetable matter can be most conveniently and abundantly supplied by sowing cow peas and turning in the vines. Two crops of these, if early varieties are used, may be turned in the same year, or an oat stubble and a crop of peas. The lime, or marl, should be applied broadcast in the fall, after the peas are turned under, at the rate of 10 bushels of lime or 100 of marl. Mr. B. J. Wilson is burning lime at Sun Hill, No. 12½, Central Railroad. If Mr. Thorn has no marl accessible without too much cost, lime in the quantities stated above will answer his purposes.

In the Supplemental Report of 1879, the results of supplying vegetable matter alone to the soil, even after taking off the crops, is reported by Dr. L. C. Mattox of Clinch county, as follows:

"In 1876 I turned a piece of land to crab grass and got 1½ tons of hay; the same land would have made 15 bushels of oats. After saving the hay I turned under the aftergrowth and sowed oats. In 1877 I got 30 bushels of oats; turned under the stubble and sowed 2 bushels of peas per acre and got 3 tons of hay. Turned under again and sowed oats, and in 1878 got 56 bushels of oats per acre. Turned under stubble and sowed peas; got 3 tons of hay. Turned under again, and put in oats, but did not get a good stand on account of excessive rains. In 1879 harvested 40 bushels of oats. Did not get the peas in early enough this year and got only 2 tons; now fine prospect for oats on the land. I pastured the land from 6 to 8 weeks each year, and increased the crops without manure."

SUGGESTIONS TO FARMERS.

Farmers are advised not to buy any fertilizer, or chemical for compounding or composting the same, unless it has both the manufacturer's guaranteed analysis and the Inspector's tag upon or attached to it: and all farmers are requested to inform the Commissioner of Agriculture of any case where a fertilizer is sold or offered for sale without having both the guaranteed analysis and the Inspector's tag attached.

Any farmer who desires to do so, can save a fair sample of any brand of fertilizer which he purchases, and have it analyzed at the Department Laboratory. Let such sample be fairly taken—a small quantity from every sack or barrel of the same brand; or, if a large quantity is purchased, from a sufficient number of the

packages to fairly represent the whole lot. Then very thoroughly mix (but not grind or triturate) these small quantities taken from different sacks, and from the mixture fill a common quinine bottle, or any bottle holding a like amount; cork it closely and seal it with wax, and correctly label it. Let this be done in the presence of witnesses, and place it in the hands of a disinterested party for safe keeping. Let a correct and certified copy of the guaranteed analysis, and the Inspector's tag which was attached to it, be also carefully preserved by the same party.

Then, after the crop is made, if the farmer has reason to believe the fertilizer was not such as it was represented to be, let the sample be sent to this Department, either by the hand of some reliable disinterested party, or by express, prepaid, and it will be analyzed without charge.

Very respectfully,

J. T. HENDERSON,
Commissioner of Agriculture.

TABLE SHOWING GENERAL AVERAGES BY SECTIONS AND FOR THE WHOLE STATE.

[illegible]

REMARKS FROM CORRESPONDENTS.

NORTH GEORGIA.

BARTOW.—Crops have been damaged for want of labor. The prospect is not good for a sufficiency of labor for 1881. R. R. work, furnaces, etc., and emigration, are taking too much labor from farms.

DADE.—Mr. H. L. W. Allison, Rising Fawn, has 500 bushels red rust proof oats for sale at 60 cents per bushel.

FLOYD.—Cotton is the money crop of this section; and, since the price of Western bulk meat has been low, there is less attention given to hog raising at home, and, added to this, our hogs have had diseases (both cholera and skin diseases) which have destroyed a large per cent. of the pork hogs for the present season. Our corn supply is ample, also potatoes and sorghum. The sowing of wheat was progressing, and a full crop would have been sown but for continued rains for the last three weeks, leaving fully one-third of the land intended for wheat not seeded, some of which will be sowed yet if the weather permits. Fall oats were not sowed extensively, but will be supplemented by winter sowing. One thing we need is more and better pasturage and an increased interest in stock-raising, particularly in horses and mules, to supply the wants of the country. Many of us desire the stock law, to do away with old rotten fences and the practice of fencing up innocent crops and letting vicious stock have full range.

GWINNETT.—Farmers are nearly out of debt—small farmers are doing best.

MIDDLE GEORGIA.

BALDWIN.—Baldwin county has made a good cotton crop this year, and up to the last of November it was two-thirds picked out, but there have not been more than ten days suitable for picking cotton since that time. There is much cotton now in the fields, (Dec. 21), and roads very bad. The rains have retarded the sowing of small grain.

CAMPBELL.—Small crops of wheat have been sown on account of scarcity of seed and extremely bad weather. Labor is very high and not reliable. Many farmers are behind with their work. An immense amount of guano was purchased and not all paid for by ten per cent. Laborers are inclined to rent, and not disposed to hire for wages. Cotton picking by the hundred pounds was from fifty to eighty-five cents. Nearly all the cotton has been sold.

DEKALB.—Farmers generally will sow rust proof oats, and will not sow till January. There seems to be an increasing interest amongst farmers in procuring improved seeds and making a better preparation of land for crops.

JASPER.—“R. Newton raised on fifteen acres of upland, *without* fertilizers, thirty heavy bales of cotton.”

LINCOLN.—Many who have hogs can't fatten them for want of corn. Very few chufas, ground peas or field peas were planted. A good crop of these might have made up the deficiency in the corn and small grain crops. The prospect for small grain now is gloomy. Most farmers were caught by the late wet weather with no wheat and but little oats sown. The ground now is muddy with two-thirds of the wheat unsown. Half of the oat crop will be sown in the spring.

MCDUFFIE.—“Two-thirds of the farmers of this county have abandoned raising corn for their horses and substituted oats. A better cotton crop has been produced this than in any year in the last ten. The farmers are better off financially than they have been since the war.”

Another says: “In our county there is marked improvement in business of every kind. Farmers are making more thorough preparation before planting, followed by better cultivation than ever before. The large farms are giving way to smaller ones, and consequently things are booming.”

WALTON.—“Short crops have increased the indebtedness of farmers. There is less disposition on the part of laborers to hire for wages for the next year. The share system works detriment to both employer and laborer. With our present labor, farmers cannot afford to furnish land, stock and bear all other expenses except half the fertilizer, and give one-half for making the crop.”

SOUTHWEST GEORGIA.

CLAY.—We think there is no less disposition to sow oats than usual, but the decrease is owing to the top crop of cotton to pick. There will be a heavy seeding this spring.

Mr. Josh McLendon, with one mule, made eleven bales of cotton besides an abundance of corn, syrup, potatoes, rice, peas, etc.

Mr. Bright, on one acre of old land, gathered 65 bushels of corn and 1100 pounds of fodder.

CRAWFORD.—Farmers generally find it impossible to hire hands except on the crop system. The negroes are more than ever anxious to get rid of the supervision of the whites. Many negroes without money, stock, or provisions, are renting land; and of course they as well as landlords will lose money when corn, meat and stock are all to be bought on credit.

DOOLY.—We are of opinion that planting largely of grain—especially oats in this latitude—and also chufas, is the surest way of getting rid of the great burden of heavy credit prices of corn and bacon. Then we will become a self-sustaining people. Let us lose sight of the delusion that we can “get rich” by planting cotton.

MARIAN.—I have succeeded this season in raising the finest crop of turnips I or any of my neighbors have ever seen. It is the third crop produced on the same ground since last February. The first was a magnificent crop of Irish potatoes; the second, a good crop of early table peas; and the third a crop of red tops, 7-tops, and rutabaga turnips, mixed and sown broadcast on the 1st of September and covered only by the showers that fell. Without manure the land would not have produced turnips at all, as it was old and worn out. I made a compost of five hundred pounds of acid phosphate, one hundred pounds cotton seed meal, four hundred pounds of stable manure, and one peck of salt. After standing six

months under shelter I broadcasted the mixture at the rate of four thousand pounds per acre, and have made not less than one thousands bushels of turnips per acre. They vary in size from a small plate to two inches in diameter and the ground is almost solidly covered with them.

EAST GEORGIA.

BURKE.—“A disastrous successions of dry seasons in this county has cut off, very much, all provision crops—corn, oats, peas, and all grain particularly affected by drouth. All late maturing crops—cotton, potatoes, cane, etc., did better. There is but little effort to feed hogs or other meat animals, and there is a prospect of a short supply of provisions for 1881. Small farms furnish no exception to this dependency, but increase it here.”

GLASCOCK.—Farmers, as a class, are gradually learning to live on less meat, and carry their mules and horses on less corn. This is easily accomplished by rust-proof oats, and the pasture when not at work. There is less corn in the county than ever before known, but all will supplement with light purchases to meet oats in the middle of May.”

MONTGOMERY.—“It is a very difficult matter to get farm hands at any price—nearly all have gone into the timber business.”

SCREVEN.—“Owing to the almost unprecedented drouth, succeeded by very heavy rains and hot sun during the summer, and then another protracted drouth in the fall, our productions of all kinds are extremely light.”

TABLE II.

Synopsis of Weather Reports for the Year 1880.

NORTH GEORGIA.

STATIONS.	JANUARY.				FEBRUARY.				MARCH.				APRIL.				MAY.			
	Temperature.				Temperature.				Temperature.				Temperature.				Temperature.			
	Maximum.	Minimum.	Mean.	Rainfall.	Maximum.	Minimum.	Mean.	Rainfall.	Maximum.	Minimum.	Mean.	Rainfall.	Maximum.	Minimum.	Mean.	Rainfall.	Maximum.	Minimum.	Mean.	Rainfall.
Ellerslie.....	65.0	27.0	48.0	0.3	66.0	21.0	44.0	0.3	69.0	27.0	50.0	0.6	80.0	30.0	59.0	0.9	94.0	58.0	65.0	5.10
Gainesville....	74.0	30.0	52.9	2.6	71.0	25.0	49.0	2.8	72.0	34.0	54.3	9.7	86.0	33.0	62.1	5.9	90.0	53.0	69.9	3.70
Leo (White Co) ..	69.0	27.0	51.2	3.7	72.0	26.0	47.3	3.7	73.0	33.0	54.0	8.8	82.0	36.0	62.2	6.0	84.0	43.0	72.4	6.47
Mt. Airy.....	70.0	30.0	51.8	3.3	72.0	26.0	48.2	2.7	69.0	39.0	53.3	11.3	84.0	36.0	62.0	6.8	87.0	49.0	70.8	5.44
Rabun Gap.....	69.0	21.0	46.7	3.7	75.0	26.0	43.1	4.5	74.0	23.0	50.3	12.2	84.0	25.0	57.6	6.0	86.0	45.0	67.2	8.90
Rome.....	71.0	41.0	52.9	2.4	73.0	26.0	49.4	2.9	75.0	33.0	55.8	10.4	86.0	33.0	63.4	9.2	86.0	44.0	72.2	8.00
Toccoa.....	73.0	23.0	55.3	3.3	73.0	23.0	49.6	6.1	76.0	39.0	56.4	10.4	86.0	30.0	64.8	10.1	93.0	48.0	73.6	3.02
Means.....	69.8	27.6	51.1	1.8	71.0	23.2	47.2	3.7	72.6	32.6	53.8	9.8	84.0	31.9	61.5	8.4	86.7	46.8	70.4	5.09

MIDDLE GEORGIA.

Athens.....	68.0	32.0	52.7	2.6	69.0	30.0	48.1	3.1	70.0	36.0	51.3	9.1	80.0	36.0	58.0	7.8	86.0	46.0	75.5	4.82
Atlanta.....	70.0	30.0	52.8	2.6	73.0	28.0	49.0	3.0	77.0	34.0	55.0	11.4	86.0	37.0	62.0	5.7	87.0	48.0	71.3	4.26
Carrollton.....	71.0	30.0	53.4	2.2	75.0	27.0	50.2	2.4	77.0	33.0	56.6	9.2	88.0	35.0	64.0	5.2	85.0	45.0	71.5	2.80
LaGrange.....	72.0	31.0	52.7	1.8	76.0	25.0	50.3	3.6	81.0	35.0	57.9	11.6	86.0	37.0	60.8	3.6	87.0	58.0	73.0	4.70
Macon.....	78.0	40.0	57.0	1.9	85.0	32.0	56.0	2.1	80.0	40.0	60.0	5.6	88.0	38.0	65.6	4.3	89.0	56.0	72.0	8.22
Oxford.....	71.0	32.0	52.2	2.7	72.0	30.0	49.4	2.3	81.0	34.0	55.4	11.0	86.0	34.0	63.2	7.0	88.0	46.0	71.7	3.05
Thomson.....	75.0	35.0	55.1	3.1	80.0	30.0	54.9	2.9	81.0	38.0	59.7	6.5	89.0	34.0	66.2	4.6	88.0	53.0	74.0	1.45
Woodbury.....	76.0	32.0	67.0	2.8	77.0	30.0	53.6	3.0	82.0	39.0	61.4	5.2	88.0	39.0	66.9	3.0	...	...	...	...
Means.....	72.7	28.7	55.6	2.4	75.6	29.0	51.4	2.8	79.1	36.1	57.1	8.7	86.6	35.7	63.4	5.1	87.1	50.8	72.7	3.40

SOUTHWEST GEORGIA.

Americus.....	32.0	36.0	61.1	1.2	50.0	34.0	66.5	4.7	56.0	39.0	65.3	3.5	89.0	37.0	72.4	4.1	86.0	62.0	75.4	3.75
Cuthbert.....	38.0	43.0	58.0	3.2	80.0	34.0	59.0	3.0	88.0	45.0	68.2	4.2	88.0	46.0	71.0	2.0	92.0	60.0	76.0	3.20
Nashville.....	77.0	41.0	59.3	4.4	80.0	34.0	57.6	3.1	85.0	41.0	57.6	2.9	87.0	44.0	68.5	1.3	87.0	55.0	74.3	10.81
Thomasville....	77.0	41.0	59.3	4.4	80.0	34.0	57.6	3.1	85.0	41.0	57.6	2.9	87.0	44.0	68.5	1.3	87.0	55.0	74.3	10.81
Means.....	79.0	39.7	59.5	2.9	80.0	34.0	57.7	3.3	86.3	41.7	63.7	3.5	88.0	42.3	70.6	2.5	88.3	59.0	75.2	5.92

EAST GEORGIA.

Augusta.....	73.0	34.0	56.2	3.5	77.0	30.0	53.0	2.0	80.0	33.0	57.0	5.9	85.0	33.0	60.5	5.0	84.0	52.0	72.5	8.17
Ch'ncey (D'ge) ..	77.0	34.0	53.6	1.7	82.0	29.0	54.8	5.2	86.0	...	...	2.0	94.0	45.0	...	2.0	98.0	60.0	79.2	3.60
McBae.....	77.0	33.0	59.2	2.5	78.0	35.0	57.7	2.4	80.0	44.0	62.7	2.5	85.0	43.0	66.3	6.4	88.0	57.0	75.5	1.70
Ogeechee.....	75.0	32.0	57.4	2.3	80.0	34.0	54.6	2.7	87.0	36.0	62.3	2.4	84.0	42.0	68.9	4.8	95.0	57.0	74.8	1.70
Bwainsboro....	75.0	33.0	59.2	2.5	78.0	35.0	57.7	2.4	80.0	44.0	62.7	2.5	85.0	43.0	66.3	6.4	88.0	57.0	75.5	1.70
Means.....	75.5	34.0	57.8	2.5	79.2	32.2	55.0	3.0	83.2	37.7	60.7	3.2	89.7	40.0	64.7	3.9	91.2	56.5	75.5	2.54

SOUTHEAST GEORGIA.

Blackshear.....	87.0	39.0	61.9	3.6	84.0	39.0	64.7	3.8	80.0	46.0	51.0	67.1	1.0	93.0	67.0	77.1	1.6	94.0	64.0	78.9	8.66
Brunswick.....	75.0	42.0	60.8	1.8	78.0	38.0	57.0	4.1	83.0	47.0	66.0	1.2	89.0	45.0	71.0	1.2	89.0	62.0	74.0	6.93	
St. Mary's.....	79.0	41.0	60.4	2.8	82.0	39.0	58.5	4.0	88.0	43.0	67.4	1.8	90.0	44.0	70.0	1.9	88.0	64.0	73.4	8.40	
Walthourville..	75.0	35.0	58.9	3.0	82.0	36.0	56.8	3.1	86.0	40.0	65.1	1.0	88.0	40.0	68.6	2.0	90.0	59.0	71.9	4.70	
Means.....	79.4	39.0	60.3	2.7	81.6	38.0	59.2	3.9	85.7	45.2	66.4	1.2	90.0	49.0	71.7	1.6	90.2	62.2	74.5	6.92	
For State.....	74.9	31.9	55.8	2.8	76.4	29.7	52.5	3.4	79.8	37.4	58.7	6.4	86.9	38.0	65.2	5.0	88.3	53.4	73.1	4.41	

TABLE II.—Continued.

Synopsis of Weather Reports for the Year 1880.

NORTH GEORGIA.

STATIONS.	JUNE.				JULY.				AUGUST.				SEPTEMBER.				OCTOBER.			
	Temperat're				Temperat're				Temperature				Temperature				Temperature			
	Maximum.	Minimum.	Mean.	Rainfall.	Maximum.	Minimum.	Mean.	Rainfall.	Maximum.	Minimum.	Mean.	Rainfall.	Maximum.	Minimum.	Mean.	Rainfall.	Maximum.	Minimum.	Mean.	Rain fall.
Ellerslie.....	88.0	54.0	71.0	0.91	88.0	61.0	70.3	5.60	84.0	60.0	72.0	...	80.0	50.0	66.0	7.40	75.0	39.0	57.0	3.40
Gainesville.....	89.0	59.0	74.7	2.15	92.0	66.0	77.1	2.75	89.0	64.0	75.4	5.65	84.0	45.0	63.4	6.50	75.0	35.0	59.9	2.13
Leo (WhiteCo).....	91.0	61.0	70.8	2.74	64.0	66.0	80.0	2.30	90.0	67.0	79.2	7.07	85.0	46.0	68.6	4.27	80.0	32.0	60.6	3.22
Mt. Airy.....	92.0	62.0	76.2	3.34	92.0	67.0	78.1	2.08	89.0	64.1	75.5	3.75	86.0	45.0	68.7	5.71	81.0	33.0	59.5	3.15
Rabun Gap.....	91.0	60.0	71.7	1.85	92.0	61.0	72.5	4.50	97.0	64.0	77.5	4.85	82.0	45.0	63.8	5.50	73.0	26.0	54.7	2.90
Rome.....	92.0	59.0	77.0	2.35	96.0	65.0	79.2	2.65	91.0	69.1	77.7	3.75	86.0	46.0	70.1	5.12	76.0	34.0	60.8	2.95
Toccoa.....	99.0	64.0	79.2	3.22	91.0	70.0	80.3	3.29	90.0	67.0	78.6	7.77	...	...	...	...	...	...	...	...
Means.....	91.7	59.8	77.2	2.22	92.0	65.1	76.8	3.31	89.3	65.8	76.0	6.31	83.8	46.7	67.5	5.75	76.7	34.0	58.7	2.94

MIDDLE GEORGIA.

Athens.....	96.0	65.0	82.1	3.24	94.0	74.0	84.1	3.21	90.0	67.0	79.2	4.85	84.0	57.0	71.0	5.35	80.0	43.0	64.0	3.13
Atlanta.....	90.0	63.0	75.7	5.30	92.0	68.0	78.5	2.47	92.0	65.0	76.4	3.22	86.0	47.0	69.1	5.98	80.0	41.0	60.8	2.77
Carrollton.....	95.0	65.0	76.1	3.35	93.0	72.0	80.2	2.99	91.0	64.0	77.8	3.87	83.0	45.0	69.5	5.99	80.0	26.0	59.9	1.85
LaGrange.....	94.0	65.0	73.7	1.30	97.0	72.0	81.4	4.06	94.0	69.0	78.3	4.80	92.0	52.0	66.9	2.10	80.0	37.0	64.6	2.50
Macon.....	92.0	67.0	73.5	1.49	95.0	70.0	83.0	2.67	95.0	63.0	80.0	6.73	92.0	54.0	73.0	1.76	82.0	32.0	66.0	2.61
Oxford.....	94.0	64.0	77.1	3.05	94.0	70.0	82.9	3.15	92.0	64.0	76.8	7.00	86.0	56.0	70.9	4.49	81.0	34.0	60.0	3.70
Thomson.....	93.0	65.0	79.2	0.00	93.0	71.0	83.1	4.05	94.0	67.0	79.3	5.70	90.0	55.0	74.3	1.40	85.0	36.0	64.3	3.90
Woodbury.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Means.....	94.4	64.4	78.1	2.52	94.8	71.0	81.7	3.24	93.0	68.6	78.1	5.49	89.8	51.2	70.1	4.05	81.0	37.0	63.2	2.92

SOUTHWEST GEORGIA.

Americus....	95.0	65.0	81.7	1.65	96.0	74.0	81.5	1.65	96.0	72.0	80.6	3.05	88.0	60.0	75.5	1.35	82.0	43.0	61.6	2.57
Cuthbert.....	93.0	68.0	81.6	1.45	97.0	71.0	83.2	5.80	96.0	71.0	81.4	6.35	89.0	60.0	79.5	3.50	84.0	48.0	72.6	3.65
Nashville.....	95.0	71.0	81.9	1.75	93.0	75.0	82.0	3.15	91.0	72.0	80.0	10.25	90.0	62.0	78.0	3.30	88.0	45.0	70.0	3.60
Thomasville.....	95.0	71.0	80.5	3.81	93.0	71.0	82.1	4.55	95.5	73.0	79.7	12.73	90.0	60.0	75.4	2.67	81.0	41.0	66.4	4.25
Means.....	94.5	68.7	81.4	2.17	94.9	72.7	81.9	4.54	95.7	72.0	80.6	9.04	89.2	60.5	77.0	2.70	84.5	44.2	63.4	3.56

EAST GEORGIA.

Augusta.....	95.0	66.0	78.5	0.72	92.0	72.0	81.0	4.20	91.0	69.0	78.6	4.60	88.0	58.0	73.0	1.55	81.0	37.0	63.0	2.30
Ch'ncey (D'ge).....	...	...	...	...	...	...	...	...	...	...	...	...	94.0	58.0	80.8	3.20	83.0	44.0	63.6	5.15
McRae.....	102.0	67.0	81.8	1.80	101.0	75.0	85.6	3.90	...	...	...	...	...	...	...	...	...	...	...	...
Ogeechee.....	99.0	69.0	83.9	0.27	96.0	73.0	81.0	4.85	94.0	73.0	81.5	4.44	91.0	60.0	75.3	0.75	...	...	...	...
Swainsboro.....	102.0	64.0	83.6	1.18	102.0	74.0	85.7	1.31	100.0	69.0	82.8	6.18	94.0	60.0	77.0	1.66	86.0	42.0	68.8	2.70
Means.....	98.7	66.3	81.7	0.8	97.7	73.5	83.3	4.35	95.0	70.3	80.7	5.38	91.0	57.0	76.3	1.83	85.0	41.0	65.8	3.2

SOUTHEAST GEORGIA.

Blackshear.....	99.0	67.0	82.0	1.14	99.0	70.0	83.0	5.66	99.0	70.0	80.7	2.50	...	...	...	...	87.0	63.0	75.3	9.00
Brunswick.....	101.0	71.0	84.5	2.84	96.0	71.0	82.0	4.62	91.0	72.0	80.7	2.54	88.0	64.0	76.0	6.45	82.0	46.0	68.0	12.
St. Mary's.....	97.0	74.0	79.5	1.60	95.9	74.0	82.0	3.45	...	...	...	...	...	...	...	...	...	...	...	...
Walthourville.....	99.0	63.0	80.1	0.62	97.0	70.0	81.8	6.45	92.0	70.0	72.6	4.00	90.0	61.0	74.1	4.92	83.0	45.0	65.1	5.93
Means.....	99.0	70.0	81.1	2.55	96.7	72.5	82.2	5.04	95.0	70.7	78.0	3.01	89.0	62.5	75.0	5.73	84.0	51.0	69.5	9.04
For State.....	94.0	64.5	78.3	2.22	94.8	70.3	80.7	3.13	92.8	68.1	77.1	5.90	87.7	53.7	72.1	4.12	81.3	39.8	64.0	3.90

TABLE II—CONCLUDED.

NORTH GEORGIA.

STATIONS.	NOVEMBER.				DECEMBER.				ANNUAL MEAN TEMPER- ATURE.		TOTAL RAIN- FALL.		Latest Spring Frost	First Autumn Frost	NAME OF OBSERVER
	Temperat're.				Temperat're.										
	Maximum.	Minimum.	Mean.	Rainfall.	Maximum.	Minimum.	Mean.	Rainfall.							
									1880.	1879.	1880.	1879.			
Ellerslie.....	61.0	17.0	39.0	12.6	61.0	2.0	30.0	3.50	55.7	55.8	67.4	45.3	Apr. 11.	.....	Miss E L Howard
Gainesville....	64.0	23.0	43.5	5.80	64.0	-3.0	9.9	3.79	60.0	62.2	55.5	76.3	Apr. 12.	Oct. 23.	C B LaHatte
Leo (White Co)	66.0	18.0	45.3	8.41	.....	.....	.....	5.79	60.6	60.5	56.7	66.6	Apr. 12.	Oct. 24.	Jno M Dorsay
Mt. Airy.....	68.0	22.0	46.0	8.27	65.0	4.0	39.7	3.84	50.9	60.8	61.2	60.9	Apr. 12.	Oct. 24.	F J Boond
Raban Gap....	64.0	16.0	43.0	4.30	61.0	-5.0	6.0	1.80	56.5	56.3	66.1	83.8	Apr. 13.	Oct. 23.	W A Curtis
Rome.....	66.0	21.0	46.0	6.10	63.0	-1.0	39.5	5.65	62.0	63.8	56.6	43.0	Apr. 13.	Oct. 18.	R S Norton
Toccoa.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Apr. 12	Oct. 18.	W H Davis
Means.....	64.8	19.5	44.1	8.25	63.4	-0.6	37.0	4.38	59.4	59.7	61.1	57.5			

MIDDLE GEORGIA.

Athens.....	66.0	25.0	43.0	5.76	67.0	1.0	43.0	4.62	63.2	.....	57.3	.....	Apr. 12.	Nov. 2	W M Browne
Atlanta.....	65.0	26.0	46.8	7.82	69.0	-2.0	49.7	5.38	61.7	60.9	61.0	47.5	Apr. 12.	Nov. 1	R J Redding
Carrollton....	70.0	21.0	45.2	5.30	73.0	-3.0	40.0	4.83	62.0	61.6	60.0	46.7	Apr. 12.	Nov. 1	S J Brown
LaGrange.....	75.0	26.0	48.7	1.9	63.0	4.0	41.4	7.97	72.9	62.0	53.0	41.5	Apr. 12.	Nov. 1	H H Cary
Macon.....	76.0	30.0	53.0	4.42	68.0	13.0	44.0	7.25	65.7	63.3	44.2	33.4	Apr. 12.	Nov. 24	H J Peter
Oxford.....	69.0	24.0	45.6	5.05	68.0	-5.0	38.9	4.50	62.1	62.2	57.5	42.7	Apr. 12.	Nov. 1	Miss E S Stewart
Thomson.....	76.0	25.0	50.1	5.66	70.0	4.0	45.1	4.15	65.5	64.3	43.4	31.9	Apr. 12.	Nov. 2	A E Sturgis
Woodbury.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	P W Martin
Means.....	71.0	25.0	48.2	5.55	70.2	0.6	41.8	5.53	63.3	62.7	52.2	41.4			

SOUTHWEST GEORGIA.

Americus.....	75.0	32.0	53.5	5.80	78.0	9.0	49.0	3.00	60.2	67.0	55.2	47.4	.....	Nov. 21.	Jno A Cobb
Cuthbert.....	70.0	32.0	54.0	5.25	81.0	9.0	50.0	3.90	.....	.....	.....	.....	.....	Nov. 24.	B C Adams
Nashville.....	80.0	37.0	59.0	3.65	76.0	14.0	52.8	3.55	69.7	67.0	44.9	51.6	.....	Nov. 23.	H T Peoples
Thomasville..	80.0	38.0	56.5	3.82	75.0	13.0	59.8	3.78	67.1	.....	58.3	.....	Apr. 12.	Nov. 23.	L S McSwain
Means.....	76.2	34.5	56.5	4.63	76.3	12.0	50.5	3.64	63.7	67.5	50.1	49.5			

EAST GEORGIA.

Augusta.....	73.0	36.0	50.7	5.05	74.0	6.0	44.0	3.85	64.0	64.2	42.0	34.5	Apr. 13.	Nov. 13.	W K Nelson
Ch'ncey, D'ge	78.0	32.0	57.0	7.35	80.0	12.0	57.2	6.46	.....	.....	.....	.....	.....	Nov. 16.	J W Tucker
McRae.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	E F McRae
Ogeechee.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	J R Cooper
Swainsboro....	72.0	28.0	52.7	6.10	70.0	8.0	45.8	5.17	67.6	66.8	41.5	35.1	Apr. 12.	Nov. 24.	E H Edenfield
Means.....	74.8	28.7	53.5	6.50	77.0	9.0	24.9	5.16	65.8	65.0	41.7	31.8			

SOUTHEAST GEORGIA.

Blackshear....	73.0	36.0	50.6	3.50	59.0	21.0	41.5	6.50	.....	.....	.....	.....	Feb. 4	.....	T J Fuller
Brunswick....	78.0	33.0	59.2	3.41	76.0	17.0	6.2	2.60	.....	68.8	50.0	50.1	Feb. 4	Nov. 16.	H A Kenrick
St. Mary's....	.....	.....	.....	.....	.....	.....	.....	.....	69.6	.....	.....	52.6	.....	.....	E A McWhorter
Walthourville	75.0	35.0	55.9	4.96	78.0	15.0	48.8	6.72	66.6	66.3	48.5	48.2	Apr. 13.	Dec. 8.	J L Harden
Means.....	75.3	44.8	60.5	3.96	77.0	16.0	52.5	4.66	68.1	67.9	49.2	48.2			
For State....	71.3	28.3	50.9	6.00	70.9	4.5	43.4	1.79	63.6	64.5	53.1	16.6			

GERMAN CARP.

THEIR HABITS, FOOD AND MANAGEMENT, CONSTRUCTION OF PONDS, ETC.

This valuable fish is supposed to have been introduced into Europe from Central Asia, many centuries ago. They have received the name of German carp on account of the great attention bestowed upon them in Germany, where no inconsiderable revenue is derived from their culture. Dr. Hessel says: "In Austria, which possesses the most extensive carp-fisheries in Europe, the culture of the carp can be traced as far back as the year 1227." The magnitude of the enterprise, in Germany may be inferred from the fact that on a single estate 20,000 acres are devoted to carp ponds, the annual product of which is about 500,000 pounds of marketable carp.

Three varieties of carp are cultivated, which are thus described by Dr. Hessel, superintendent of the United States carp ponds at Washington, D. C.:

1. *Cyprinus, carpio communis*, the scale carp; with regular, concentrically arranged scales, being in fact, the original species improved.

2. *Cyprinus carpio specularis*, the mirror carp; thus named on account of the extraordinarily large scales, which run along the sides of the body in three or four rows, the rest of the body being bare.

3. *Cyprinus carpio coriaceus, sive nudus*, the leather carp; which has on the back, either only a few scales or none at all, and possesses a thick, soft skin which feels velvety to the touch.

These are all superior varieties, well worthy of cultivation. The mirror and leather carp are shorter, stouter, and more fleshy, than the scale carp, and less liable to be injured while being transported.

HABITS, GROWTH, ETC.

The carp is sluggish in its habits, not very choice in its food, and grows under favorable circumstances, with remarkable rapidity. Under ordinary circumstances, where the winters are sufficiently cold to compel them to hibernate, they attain a weight of from three to four pounds in three years. Under more favorable circumstances, in warm climates, where they feed nearly or quite the whole year, they will more than double this growth. They are peculiarly adapted to Southern waters on this account. In cold climates they bury themselves in the mud, arranging themselves in "kettles," with their heads together, and their tails projecting out of the mud. They feed naturally upon insects, and the leaves, roots and seeds of grass and other aquatic plants, and hence ponds in which they are placed should be well supplied with such plants. They may be artificially fed upon boiled rice or grain, upon dough, or upon cabbage, lettuce etc., chopped fine.

The carp is extremely prolific, a fish of 4 or 5 pounds, containing from 400,000 to 500,000 eggs. In the latitude of Washington city they spawn when 3 years old; it is thought they will spawn one year earlier in Southern Georgia. They commence to spawn in warm climates early in April, and later as latitude increases and temperature falls, extending even to August in Northern latitudes, where they remain in winter quarters until late in the spring. They do not deposit all of their eggs at once, but continue to deposit a portion of them at a time, for some days and even weeks. The eggs are surrounded by a gelatinous substance which adheres to any object with which they come in contact. They attach themselves to blades of grass, to weeds, brush, stones, etc., and all which fall to the bottom are lost. The necessity, therefore, of an abundance of aquatic plants, especially in the hatching ponds, will be apparent, since they serve the double purpose of supplying food for the fish, and a natural place of deposit for the eggs.

The *Festuca fluitans*, commonly called "water grass," seems to be preferred by the carp as food, and its slender leaves form favorite supports for the eggs.

The eggs will hatch in shallow, well warmed water, in from twelve to sixteen days—if the water is too deep, and consequently cold, twenty days may be required. The young fish begin to take food in from three to five days after they are hatched. During this interval they subsist upon the yolk contained in sacs attached to their bodies.

GROWTH.

The growth of the carp will depend upon the climate, *i. e.*, whether they can feed during a longer or shorter period during the year, and the abundance of the natural food supply; and will depend also upon the number kept in a given area of water, or upon the care and skill of their keeper in supplying them artificially with food.

Dr. Hessel, in speaking of the wonderful adaptation of the waters of the Southern United States to carp culture, after alluding to the abundant growth of varieties of the water lily, wild rice, and other aquatic plants, and to the fact that where they attain the normal growth of from 3 to 4 pounds in three years, they have only 4 or 5 months in which to feed and grow, says: "It is not to be doubted that the carp will arrive at the weight of from $2\frac{3}{4}$ to 4 pounds in one year in those warm climates, when, in colder regions it requires two years and six months. I do not think that I am mistaken in this; I am ready to stand by this assertion, which the future will surely verify." This was written for the report of the U. S. Commissioner for 1875-1876, and his prediction has already been verified in Georgia by the experience of those who received young fry from the U. S. Commissioner through this department in the fall of 1879.

Specimens taken from a pond in Dougherty county last October weighed ~~seven~~ pounds at two years of age.

There seems to be no other fish so well adapted to pond culture as the carp. Indeed, it is to other fish what the pig is to wild animals. It is thoroughly domesticated, bears transportation better than any other fish, consumes a greater variety of food, and of kinds that are easily and cheaply provided, and grows more rapidly than any other cultivated variety of fish.

CONSTRUCTION OF PONDS.

Ponds for carp need not be very deep except over a small area near the outlet, in which the fish may collect for protection from extremes of either heat or cold, and for convenience of taking the fish intended for market or transferring to other ponds when the water is drawn off for that purpose.

Dr. Hessel says: "Ponds must not be too deep, as the water will be colder and will harbor fewer insects, larvæ and worms, which form part of the carp's food; besides this fish does not grow quickly in cold water. A depth of three feet in the centre of the pond is sufficient; toward the outlet-sluiice it may be from 6 to 8 feet deep, but only for an area of from 200 to 1,000 square feet, according to the size of the pond. In the depths of this collector the fish seek their resting place for the winter, and also in the summer, when the water is too warm near the edge.

"The outer part of the pond should not be deeper than 1 foot for the distance of about 70 or 100 feet, so that the water there may be warmed more thoroughly by the sun. Toward the the centre of the pond, and in accordance with its size, a cavity of from 20 to 50 feet in length and 2 feet deeper than the rest of the ground, should be dug." Transverse ditches are cut leading into this cavity, which empties into the outlet sluice. The principal object of the deeper area at the outlet-sluiice and the ditches leading to it is to collect the fish into a small area when the pond is drawn off. They should be about 1 foot deeper than the adjoining surface.

Ponds for carp should have a loamy bottom; rocky or sandy bottoms are not suitable for them. Spring water is not so good for them as that from creeks. If spring water is used it should be conducted as far as practicable through a broad shallow ditch before entering the pond. Ponds should be so constructed as to prevent a rapid rise or fall of the water; they should be kept uniformly at the same depth, with inlets and outlets well protected by wire grating to exclude predacious fish and to prevent a rapid inflow or outflow of the water. Water from mineral springs should not be allowed to flow into the ponds.

Before commencing to construct a dam, a ditch should be cut the full length of the intended dam, four feet wide and of sufficient depth to reach firm soil, free from roots or alluvial deposits. This ditch should be filled with loam to the depth of a foot and this compactly tramped down and this process continued until the ditch is filled.

The dam should then be constructed of loam, not clay or sand, having a width at the top equal to its height.

Every pond, whether intended for amateur or market culture, should be so arranged that the water may be drawn off at pleasure. This may be done at a moderate cost, by the use of iron piping three inches in diameter, provided inside the pond with a valve, which may be opened or closed at will by means of a long key. Plank boxing, provided with grating on the sides, to admit water but exclude the fish, serves the double purpose of protecting the valve and guiding the use of the key.

If systematic culture is intended, there should be three ponds. One for hatching the young fish, one for breeding till they are a year old, and one for culture or rearing the fish for market or for the table.

The hatching pond need not be large, should be shallow, and full of vegetation of a character suitable for receiving the deposit of eggs.

Dr. Hessel says: "The hatching pond should not be as large as the breeding pond; its depth not to exceed 1 or 1½ foot. The outer portion, or, as it is termed, the low-water margin, should generally be from two to five inches in depth, and from 30 to 40 feet in width. Provision should be made that *festuca ovina* (water grass) grows there plentifully, for the fishes give the preference to this plant for the deposition of their eggs. . . . But the bottom of these hatching ponds must be of a similar construction to that of the larger ones; that is, they must be provided with the cavities or kettles, collectors and collector ditches. The collectors must be cleaned from the mud every spring." A depth of four or five inches will answer for the collectors for the small fish.

"The hatching ponds should have outlets and reserve sluices in the dam at the lower end or on the sides to guard against overflows. These ponds must be secured against the intrusion of pike, eels, bass, catfish, tritons, water-snakes, turtles, frogs, etc., by means of gratings and a close plank fence let into the ground not less than six inches."

The spawners and milers are put into the hatching pond in the spring before the spawning season arrives. From three to six females to from two to four males will produce enough young fish, allowing for casualties, to stock a culture pond of an acre in area. From 800 to 1,000 eggs will hatch from each spawner.

The breeding ponds are constructed, in every particular, like the hatching ponds, except that they should be deeper and larger. The kettles should be from four to five feet deep, counting from the surface of the water, and the margins from five to eight inches deep. They should also be well provided with grass. The breeding ponds are stocked by the removal of the fry from the hatching pond in the latter part of March. The process, therefore, will be

as follows: The fish are hatched in the hatching pond in the early spring and summer. In March of the following year they are removed to the breeding pond, where they remain until the spring of the third year, when they are transferred to the culture pond, after the marketable fish have been removed from the latter. The culture or carp ponds proper are constructed in the same way as the hatching and breeding ponds, except that they are larger and deeper as before described.

It is estimated that 1,000 fish will stock an acre and thrive without artificial feeding. If more than this number occupy that area, artificial feeding must be resorted to.

REMARK.

The above condensed statement is published for the general information of the people of the State, and especially for the guidance of those who have embarked, or propose embarking, in the culture of this most valuable fish.

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